



RINA

VALIDATION REPORT

Final

“SHPs Albano Machado and Rio dos Índios CDM Project
(JUN1115)”
in
Brazil

Report N° 2010-BQ-04-MD
Revision N° 1.2



VALIDATION REPORT

Project Title: "SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)"		Country: Brazil	Estimated CERs (tCO₂e): 15,838 annual average	
Client: Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A		Client contact: Mr. Alvaro de Almeida and Mr. Arthur Moraes		
Report No.: 2010-BQ-04-MD		Revision: 1.2	Date of this report: 17/01/2012	
Approved by (Final Report – DCI Director approval):			Date of approval:	
Methodology				
Number: AMS-I.D	Version: version 17 of 03/06/2011	Title: "Grid connected renewable electricity generation"	Scale Small	SS(s): 1
<p>RINA Services S.p.A. (RINA), commissioned by Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A, performed the validation of the project activity "SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)" in Brazil, with regard to relevant requirements of CDM, activities.</p> <p>In conclusion, it is RINA's opinion that the project activity "SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)", in Brazil, as described in the PDD version 4 of 17/01/2012, meets all relevant requirements for CDM activities and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.D "Grid connected renewable electricity generation" version 17 of 03/06/2011. Hence RINA requests the registration of the project as a CDM project activity.</p> <p>Prior to the submission of the Request for Registration 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.</p>				

Work carried out by: Geisa Maria Principe Branco Saettoni, Américo Varkulya Junior, Thaís de Lima Carvalho Tiago Mendonça de Oliveira Cintia Mara Miranda Dias	<input checked="" type="checkbox"/> No distribution without permission from the Client or organizational unit responsible <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
Work verified by (Final Report – CRT person responsible approval)	Keywords: Climate Change, Kyoto Protocol, Clean Development Mechanism, Validation



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Abbreviations

AM	Albano Machado SHP
BE	Baseline Emissions
BOVESPA	“Bolsa de Valores de São Paulo” - São Paulo Stock Exchange
CAR	Corrective Action Request
CCEE	“Camara de Comercialização de Energia Elétrica”- Electric Power Commercialization Chamber
CDM	Clean Development Mechanism
CDM M&P	CDM Modalities and Procedures
CER(s)	Certified Emission Reduction(s)
CIMGC	“Comissão Interministerial de Mudança Global do Clima” - Interministerial Commission on Global Climate Change
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
FEPAM	Fundação Estadual de Proteção Ambiental (Rio Grande do Sul State Environmental Agency)
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IGP-M	“Índice Geral de Preços - Mercado” - General Index of Market Prices
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MME	Brazilian Mines and Energy Ministry
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-governmental Organization
NTN-C	“Notas do Tesouro Nacional, série C” - National Treasury Notes, Series C
ODA	Official Development Assistance
ONS	“Operador Nacional do Sistema”- National Grid Operator
PDD	Project Design Document
PE	Project Emissions
PP(s)	Project Participant(s)
PROINFA	“Programa de Incentivo às Fontes Alternativas de Energia Elétrica” - Programme of Incentives to the Alternative Sources of Electric Energy
Ref.	Document Reference
RDI	Rio dos Índios SHP
RINA	RINA Services Spa
SHP	Small Hydropower Plant



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SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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1 INTRODUCTION

Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A have commissioned RINA to carry out the validation of the “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” project in Brazil.

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

1.1 Objective

The objective of the Validation is to have an independent evaluation of a project activity by a designated operational entity against the requirements of the CDM as set out in decision 3/CMP.1, its annex and relevant decisions of the COP/MOP, on the basis of the project design document. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC requirements and host Party 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 is to review the PDD against the UNFCCC criteria for CDM.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

Validation is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

2 METHODOLOGY

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Manual, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following three phases:

- Document review;
- Follow-up actions;
- The resolution of outstanding issues and the issuance of the final validation report.

The following sections outline each step in more detail.

2.1 Document Review

The PDD, version 4 of 17/01/2012 and previous versions 3 of 15/04/2011, 2 of 05/01/2011 and 01 of 11/11/2009 /1/ in particular the applicability of the methodology, the baseline determination, the additionality of the project activity, the starting date of the project, the monitoring plan, the emission reduction calculations provided in the form of a spreadsheet, “JUN1115_CERs_v4_2.xls”, version 4, dated 17/01/2012 and previous versions /8/, were assessed as part of the validation.

The following table lists the documentation that was reviewed during the validation.

/1/	Carbotrader Assessoria e Consultoria em Energia Ltda.: CDM-PDD for project activity “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” in Brazil, version 4 of 17/01/2012 Version 3 of 15/04/2011 version 2 of 05/01/2011 version 01 of 11/11/2009.
/2/	CDM Executive Board: Baseline and monitoring methodology AMS-I.D, “Grid connected



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	<i>renewable electricity generation</i> ", version 17 of 03/06/2011 (valid from 17/06/2011) and previous versions: 16 of 28/05/2010, version 15 of 16/10/2009
/3/	CDM Executive Board: Validation and Verification Manual, version Version 1.2, EB 55 annex 1 dated 30/07/2010
/4/	CDM Executive Board "Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)", version 5 of 15/09/2007.
/5/	CDM Executive Board "Guidelines on the demonstration and assessment of prior consideration of the CDM" – EB62 Annex 13, version 4 of 15/07/2011 and EB 41, Annex 46, version 1 02/08/2008.
/6/	CDM Executive Board "Glossary of CDM Terms", version 5 of 19/08/2009.
/7/	CDM Executive Board "Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities". Version 8 of 29/09/2011
/8/	Carbotrader CERs spreadsheet "JUN1115_CERs_v4_2.xls", version 4, dated 30/11/2011 "JUN1115_CERs_v3.xls" version 3, dated 15/04/2011 (corresponds to the PDD version 3) "JUN1115_CERs_v2.xls" version 2, dated 05/01/2011 ((corresponds to the PDD version 2) "JUN1115_CERs_v1.xls", dated 11/11/2009 (corresponds to the published PDD)
/9/	Electra Power Geração de Energia Ltda. SHP Albano Machado IRR spreadsheet, Analise_AM_carbono_infl_v2.xls, version 2 (corresponds to data presented from the PDD version 3 on). (Analise_AM_carbono_infl_v2.xls) version 1 "IRR_AM.xls" (corresponds to data presented in the published PDD)
/10/	Electra Power Geração de Energia Ltda., SHP Rio dos Índios IRR spreadsheet version 2.1 "Analise_RDI_carbono_infl_v2_1.xls" (corresponds to data presented from the PDD version 4) Version 2 "Analise_RDI_carbono_infl_v2.xls" (corresponds to data presented from the PDD version 3) version 1 "IRR_RDI.xls" (corresponds to data presented in the published PDD)
/11/	ANEEL Dispatch number 3,761, dated 05/10/2009 for Albano Machado SHP
/12/	ANEEL Dispatch number 3,473 dated 19/08/2009 for Rio dos Índios SHP
/13/	ANEEL Authorization Resolution number 764, dated 12/12/2006 for Albano Machado SHP
/14/	ANEEL Authorization Resolution number 1826, dated 03/03/2009 for Rio dos Índios SHP
/15/	ANEEL Resolution number 407, dated 19/10/2000
/16/	FEPAM Preliminary License to SHP Albano Machado: LP number 703/2004-DL, dated 03/09/2004.
/17/	FEPAM Installation License to SHP Albano Machado: LI number 878 /2009-DL, dated 10/08/2009.
/18/	FEPAM Updated installation License to SHP Albano Machado: LI number 03/2010- DL, dated 04/01/2010.
/19/	FEPAM Preliminary License to SHP Rio dos Índios: LP number 307/2004-DL, dated 23/04/2004.
/20/	FEPAM Installation License to SHP Rio dos Índios: LI number 375/2008-DL, dated 22/04/2008.
/21/	FEPAM updated Installation License to SHP Rio dos Índios: LI number 275/2010-DL, dated 17/03/2010.
/22/	PCH Albano Machado and Casa de Pedra Energia spreadsheet with operation and maintenance costs "Custos de OEM - ALM e RDI.xls", received on 02/06/2010.
/23/	Electra Power Geração de Energia Ltda OPE - Budget Standard Eletrobrás document for Albano Machado SHP "OPE PCH ALBANO MACHADO 10 12 08_R01-RISCHBIETER.xls", revision 1, received on 02/06/2010.
/24/	Electra Power Geração de Energia Ltda OPE - Budget Standard Eletrobrás document for Albano Machado SHP "OPE_AM.pdf"
/25/	Electra Power Geração de Energia Ltda OPE - Budget Standard Eletrobrás document for Rio dos Índios SHP "OPE_PCH RIO DOS ÍNDIOS 15 04 09.xls", revisão A, received on 02/06/2010.
/26/	Electra Power Geração de Energia Ltda OPE - Budget Standard Eletrobrás document for Rio dos Índios SHP "OPE_RDI.pdf", received on 02/06/2010.



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/27/	Casa de Pedra Energia, letter number RDI-CA-001-R0 for the Assured energy of the SHP Rio dos Índios "Carta - Solicitação de Energia Assegurada.pdf", dated 24/04/2009
/28/	ANEEL: Study of economics useful life time and depreciation, volume 2 (from Portuguese: <i>Estudo de Vida Útil Econômica e Taxa de Depreciação</i>) "relatorio_vida_util_volume_2.pdf", dated November 2000
/29/	Carbotrader and CIMGC-MCT email: email dated 21/09/2009, from Mr. Arthur Moraes to CIMGC-MCT informing that the CDM consideration was performed as per EB 41, annex 46, CIMGC-MCT response have the same date. ("Re RES Consideração prévia do MDL - PCH Albano Machado e Rio dos Índios")
/30/	Carbotrader spreadsheet: beckmark calculation "Government bond rates_v2.xls", version 2, received 25/04/2011 based on data available by the Brazilian Government, assessed on 05/05/2011: http://www.tesouro.fazenda.gov.br/tesouro_direto/download/balanco/2004/balanco_1204.pdf http://www.tesouro.fazenda.gov.br/tesouro_direto/download/balanco/2005/balanco_1205.pdf http://www.tesouro.fazenda.gov.br/tesouro_direto/download/balanco/2005/balanco_1206.pdf http://www.tesouro.fazenda.gov.br/tesouro_direto/download/balanco/2005/balanco_1207.pdf http://www.tesouro.fazenda.gov.br/tesouro_direto/download/balanco/2005/balanco_1208.pdf ; "Government bond rates.xls", version 1, received on 02/06/2010
/31/	Electra Comercializadora de Energia Ltda and Rischbieter - e-mail document with quotation of energy price "Fwd Cotação de energia.msg" dated 24/03/2009
/32/	ANEEL/ Brazilian Mines and Energy Ministry Decree number 079/2007, dated 08/05/2007
/33/	Local stakeholders consultation: letters and ARs, dated December/2009 and January 2010, respectively.
/34/	Interministerial Commission on Global Climate Change (CIMGC) Resolution 7 for the Local stakeholder consultation, 05/03/2008.
/35/	ONS Grid Procedures: Module 12, Sub-module 12.2 Installation of the Measurement System for Billing available in Portuguese at < http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.2_Rev_1.0.pdf > accessed on 02/05/2011
/36/	MCT "CO ₂ emission factors for electricity generation in Brazil's National Interconnected System - Base Year 2010" available at < http://www.mct.gov.br/index.php/content/view/307492.html > (Brazilian DNA web site) <accessed on 05/01/2012> Available in Portuguese and English.
/37/	CDM Executive Board "Tool to calculate the emission factor for an electricity system", version 2.2.1, EB 63, 29/09/2011 and previous version: version 2.2.0 of 3/06/2011, 2.1.0 of 15/04/2011, 2.0 16/10/2009
/38/	Rischbieter Engenharia e Serviço: Projeto Design Report for the SHP Rio dos Índios, including the equipments description – revision 02, dated May 2008 ("CAPÍTULO 02 _descr_geradores.pdf")
/39/	Flessak Eletro Industrial Ltda declaration letter of Generators provided to the SHP Albano Machado, dated 24/09/2010 ("Declaração.jpg")
/40/	ANEEL Resolution number 652, dated 9/12/2003, establishes the definitions for SHPs in Brazil.
/41/	ANEEL web page, definition of assured energy available in Portuguese at < http://www.aneel.gov.br/aplicacoes/capacidadebrasil/energiaassegurada.asp > accessed on 02/05/2011
/42/	ANEEL Resolution number 169, dated 3/05/2001, establishes the methods to calculate the assured energy.
/43/	CDM Executive Board "Guidelines on the assessment of investment analysis", version 5 of 15/07/2011.
/44/	CDM Executive Board "Guidelines for objective demonstration and assessment of barriers", version 1, dated 16/10/2009
/45/	ANEEL web page, Information Bank of Generation available in Portuguese at < http://www.aneel.gov.br/37.htm >, accessed on 02/05/2011. Information regarding energy generation in Brazil, SHPs, installed capacity, PROINFA, among others.



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/46/	UNFCCC web page- validation projects, available in English at < http://cdm.unfccc.int/Projects/Validation/index.html > accessed on 02/05/2011
/47/	UNFCCC web page- prior consideration, available in English at < http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html > accessed on 02/05/2011.
/48/	Flessak Eletro Indústria Ltda and PCH Albano Machado/Rio do Lobo Energia S.A. contract number AML-OC-003-RO for the generators of the SHP (purchase order), signed on 30/03/2009 (Contrato Gerador.pdf)
/49/	PCH Albano Machado/Rio do Lobo Energia S.A.; Demuth Máquinas Industriais Ltda. and Enerbras Hydro Projetos Mecânicos Ltda. contract number ALM-OC-005-R4 for the turbines of the SHP(purchase order), dated 17/04/2009, signed on 16/12/2009 (Extrato_Contratos_PCH AM.pdf)
/50/	Rio dos Índios implementation chronogram revision 4 (without date) (Cronograma_RDI_rev4.pdf)
/51/	Email form Carbotrader to RINA to request an offer to validate the project activity on 01/12/2009 (Proposta MDL para as PCHs Albano Machado e Rio dos Índios (110 KB).msg)
/52/	CDM Executive Board "Guidelines for the reporting and validation of Plant Load Factors", version 1, dated 17/07/2009.
/53/	Casa de Pedra Energia S/A letter sent the BRDE bank, dated 27/07/2010 (2010 08 02 Casa de Pedra Energia protocolo BRDE.pdf)
/54/	Energia Direta website energy price available in Portuguese at < https://www.energiadireta.com.br/index.php?sub=acompanhar.php&id=37 > (energy price information from 02/2009) accessed on 01/06/2011 and < https://www.energiadireta.com.br/index.php?sub=acompanhar.php&id=124 > energy price information from 06/2010) accessed on 01/06/2011
/55/	<i>Rischbieter Engenharia e Serviços</i> project design revision 01 dated february 2009 (Chapter 14 item 14.1, page 2) ("ProjBas_Capa_Cap14_pg2.pdf")
/56/	Brazilian Federal Law number 10.637 dated 31/12/2002, available in Portuguese at < http://www.planalto.gov.br/ccivil_03/Leis/2002/L10637.htm > accessed on 01/06/2011
/57/	Brazilian Central Bank web site, exchange rate BRL X USD available in Portuguese at < http://www4.bcb.gov.br/pec/conversao/Resultado.asp?idpai=convmoeda > accessed on 01/06/2011
/58/	Brazilian Central Bank report for the inflation index IGP-M and IPCA available in Portuguese at < http://www4.bcb.gov.br/pec/GCI/PORT/readout/R20090306.pdf > (report dated 06/03/2009) and < http://www4.bcb.gov.br/pec/GCI/PORT/readout/R20100723.pdf > report dated 23/07/2010), accessed on 01/06/2011
/59/	ANEEL Resolution number 636, of 17/04/2008
/60/	ANEEL Resolution number 848 dated 14/07/2009
/61/	Eletrobras document: SHP Projects Guidelines- Chapter 4 item 4.4.4 ("Diretrizes para Projetos de PCH"), no date available ("Diretrizes_PCH_Eletrobras_CAP4.doc")
/62/	Electrapower Board's meeting conducted on 06/01/2009 to discuss the cost of the SHPs Albano Machado, Rio dos Índios and Maria Piana (not part of the project activity) (Ata_Electrapower_Jan_2009.pdf)
/63/	Eletrobras "Directions for Small Hidro Power Plants studies and projects" (from the Portuguese: " <i>Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas</i> ") (5.0% of the investment), dated January 2000 (Diretrizes para estudos e projetos de pequenas centrais hidrelétricas.pdf)
/64/	SHP Portal, with SHP information and news (from the Portuguese "Portal PCH"): < http://www.portalpch.com.br/index.php?option=com_content&view=article&id=2749:08092009-crescimento-do-pre-sal-naoreduzira-o-papel-das-fontes-alternativas-de-energia-afirma-mauricio-tolmasquim&catid=1:ultimas-noticias&Itemid=98 > accessed on 30/11/2011
/65/	CDM Executive Board: Baseline and monitoring methodology ACM0002, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.2.0 of 25/11/2011



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/66/	CDM Executive Board: "General Guidelines to SSC CDM methodologies", version 17, dated 03/06/2011. (EB 61, annex 21).
/67/	CDM Executive Board: Non-binding best practice examples to demonstrate additionality for SSC project activities version 1.0 of 19/10/2007. (EB 35, annex 34).
/68/	UNFCCC web site: National Authorities available at http://cdm.unfccc.int/DNA/index.html assessed on 04/01/2012
/69/	CDM Executive Board: Methodological tool "Demonstration and assessment of additionality", version 06.0.0 Tool for the demonstration and assessment of additionality" version 5.2. of 25/11/2011.
/70/	Brazilian Federal Law number 9427 dated 26/12/2006 available in Portuguese at < http://www.ecologia.dbi.ufpa.br/site%20ecoaplicada/legisla%C3%A7%C3%A3o/LEI%20N%C2%BA%209427-1996.htm > and Decree 2410 dated 28/11/1997 available in Portuguese at http://www.jusbrasil.com.br/legislacao/111859/decreto-2410-97 assessed on 01/06/2011
/71/	Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A spreadsheet with historical data for the System Services Encumbrance - ESS for the subsystem South data from Jan/2003 to Aug/2006 (<i>Memória de Cálculo ESS.xls</i>)

2.2 Follow-up actions

On 17 and 18/06/2010, RINA visited the SHPs' construction located in Trindade do Sul and Nonoai cities and realized a meeting in Chapecó city to resolve questions and issues identified during the document review and to perform interviews with relevant stakeholders in the host country.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	17/06/2010	Willian Leandro B. – topographic	Electra Power	Project installation
/b/	17/06/2010 - 18/06/2010	Arthur Moraes - consultant	Carbotrader	<ul style="list-style-type: none"> - Clarifications on establishment of baseline, monitoring plan and emission reduction calculations - Project boundaries - Additionality - CDM consideration - Resources, training needs and procedures for operation and maintenance - Monitoring Plan / Records (backups) - Maintenance program (calibration) - Environmental Licenses - Local stakeholders, invitations / confirmations

2.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified for RINA's positive conclusion on the project design.

To guarantee transparency a validation protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of validation and the results from validating the identified criteria. The validation protocol consists of four tables; the different columns in these tables are described in the figure below (see Figure 1). The completed validation protocol is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions.
- The CDM requirements have not been met.



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- There is a risk that the emission reductions cannot be monitored or calculate.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration. CARs, CLs and FARs identified are included in the validation protocol in Appendix A of this report.



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Figure 1 Validation protocol tables

Validation Protocol, Table 1 - Mandatory requirement		
Requirement	Reference	Conclusion
The requirements the project must meet.	Makes reference to the documents where the answer to the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) if a requirement is not met. A request for clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol, Table 2 - Requirement checklist					
Checklist Question	Ref.	MoV	Comments	Draft Conclusion	Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in seven different sections.	Makes reference to documents where the answer to the checklist question or item is found.	Explain how conformance with the checklist question is investigated. Examples are document review (DR), interview or any other follow-up actions (I), cross checking (CC) with available information relating to projects, (N/A) means not applicable.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. For CAR, CL and FAR see the definitions above.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements.

Validation Protocol, Table 3 - Resolution of Corrective Action Requests and Clarification			
Corrective action requests and/or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
The CAR and/or CLs raised in table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusion of the CARs and/or CLs.

Validation Protocol, Table 4 - Forward Action Requests		
Forward action request	Reference to Table 2	Response by project participants Validation Conclusion
The FAR raised in table 2 is repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by the project participants on how forward action request will be addressed prior to first verification.

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2.4 Internal quality control

All the revisions of the validation report before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

2.5 Validation team and the technical reviewer(s)

The validation team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
Team Leader CDM	Principe Branco Saettoni	Geisa Maria	Brazil
CDM Validator/technical expert	De Lima Carvalho	Thaís	Brazil
CDM Validator	Varkulya Junior	Américo	Brazil
CDM Validator	Miranda Dias	Cintia Mara	Brazil
Financial expert	Mendonça de Oliveira	Tiago	Brazil
Technical Reviewer	Valoroso	Rita	Italy

3 VALIDATION FINDINGS

The findings of the validation related to the project design, as described in the PDD version 4 of 17/01/2012 and previous versions 3 of 15/04/2011, 2 of 05/01/2011 and 01 of 11/11/2009 /1/ are stated in the following sections.

The validation requirements, the means of validation and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

3.1 Approval and Participation

The project's host Party is Brazil. Brazil fulfills the requirements to participate in the CDM. Brazil has ratified the Kyoto protocol and has established a DNA according to the participating requirements for CDM under the Kyoto Protocol. Brazil ratified the Kyoto Protocol on 23 August 2002 and established as DNA "Comissão Interministerial de Mudança Global do Clima" (CIMGC) as per the UNFCCC website /68/.

The project participant(s) are Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A and Carbotrader Assessoria e Consultoria em Energia Ltda. from Brazil, and all participants are private entities. The project participants are correctly listed in table A.3 of the PDD and the information is consistent with the contact details provided in Annex 1 of the PDD /1/.

The proposed project does not involve any public funding from an Annex I Party, and the validation did not reveal any information that indicated that the project could be seen as a diversion of official development assistance (ODA) funding towards the host country.

Prior to the submission of the Request for Registration 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.

The table below will be completed after the receipt of the LoA from Brazil.

Project participants	Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A and Carbotrader Assessoria e Consultoria em Energia Ltda.	No Annex 1 country
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Parties involved	Brazil	/
APPROVAL		
LoA received	Not yet available	/
Date of LoA	/	/
LoA received from	/	/
Validation of authenticity	/	/
Validity of LoA	/	/
PARTICIPATION		
Party is party to Kyoto Protocol	Yes	/
Voluntary participation	/	/
Project contribution to SD	/	/

3.2 Project design document

The PDD for the project activity “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” in Brazil, version 4 of 17/01/2012 and previous versions 3 of 15/04/2011, 2 of 05/01/2011 and 01 of 11/11/2009 /1/ submitted by Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A and Carbotrader Assessoria e Consultoria em Energia Ltda. has been the basis for the validation process.

RINA confirms that the above PDD is based on the currently valid PDD template and is completed in accordance with the applicable guidance document the “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)”, version 5 of 15/09/2007.

The main differences between the PDD published for global stakeholder consultation version 1 and the version 4 are related to the revision of installed capacity to comply with equipments specification; inclusion of the applicability of the methodology; revision related to the updated version of the applied methodology to version 17; inclusion of a timeline for project implementation; revision of the benchmark to reflect correct information and exclusion of the risk premium, revision of the IRR spreadsheet to consider taxes/inflation; revision of the PLF of RDI to comply with the third parties evidences provided; revision of the sensitivity analysis to include the O&M and analysis of the breakeven point, exclusion of the the barrier due prevailing practice ; revision of the data storage period; inclusion of updated environmental licenses; revision of O&M costs to be in line with the evidences provided, revision of the PP names, revision in the crediting period starting date.

3.3 Project Design

The project activity consists of the installation of two new small hydropower plants: Albano Machado (3.06 MW of installed capacity) and Rio dos Índios (8.01 MW of installed capacity), located in Rio Grande do Sul state, Brazil. The SHP Albano Machado is located in the cities of Trindade do Sul and Nonoai, geographical coordinates 27° 29'48" S and 52° 48'13" W) confirmed through the ANEEL Resolution Authorization number 764, dated 12/12/2006 /13/. The SHP Rio dos Índios is located in the city of Nonoai, geographical coordinates 27°16'30"S and 50°47'38"W, confirmed through the ANEEL Resolution Authorization number 1,826, dated 03/03/2009 /14/.

The proposed project activity falls under Project category D - Grid connected renewable electricity generation, Type I – Renewable energy projects and Sectoral Scope 1- Energy industries (renewable/non-renewable sources) and qualifies as a small scale CDM project activity as the total installed capacity is less then 15 MW. The project activity is applying the methodology AMS-I.D, “Grid connected renewable electricity generation”, version 17 of 03/06/2011 /2/ that is in line with the relevant project category.



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The project is a renewable electricity generation project activity using hydro resource displacing grid electricity that is partly generated based on fossil fuels, with electricity generated from renewable sources and thus resulting in the reduction of emissions of greenhouse gases in the energy sector.

The purpose of the project activity is to provide electricity energy from renewable source as hydropower to the Brazilian National Interconnected System (SIN). At the time of the site visit, Rio dos Índios SHP had not started the equipment's installation and Albano Machado SHP was being implemented (under construction). The applicable environmental licenses are:

SHP Albano Machado:

- Preliminary License: LP number 703/2004-DL – issued by FEPAM, dated 03/09/2004 /16/
- Installation License: LI number 878 /2009-DL – issued by FEPAM, dated 10/08/2009 /17/
- Updated installation License: LI number 03/2010- DL- issued by FEPAM, dated 04/01/2010./18/

SHP Rio dos Índios:

- Preliminary License: LP number 307/2004-DL – issued by FEPAM, dated 23/04/2004./19/
- Installation License: LI number 375/2008-DL – issued by FEPAM, dated 22/04/2008./20/
- Updated installation License: LI number 275/2010-DL - issued by FEPAM, dated 17/03/2010 (substitute the previous Installation License) /21/

The Albano Machado and Rio dos Índios power plants have an installed capacity of 3.06 MW and 8.01 MW, respectively, and they are classified as Small Hydro Power Plants according to the ANEEL Resolution # 652, dated 09/12/2003 /40/ that establishes that in Brazil, to be classified as a SHP, the reservoir area must be less than 3 Km² (300 ha) and the total installed capacity must be between 1 MW to 30 MW. The installed capacity of Albano Machado was confirmed during site visit through the equipments' plates. For the Rio dos Índios SHP, as the equipments were not installed during the site visit, RINA confirmed that the equipments described in the PDD are according to the ones presented in the Project Design, rev 02 /38/ which was provided by a third party company Rischbieter Engenharia e Serviço /38/. The authorized installed capacity for Albano Machado is 3 MW and for Rio dos Índios is 8 MW, according to ANEEL Authorization Resolution number 764, dated 12/12/2006 /13/ and ANEEL Authorization Resolution number 1826, dated 03/03/2009 /14/, respectively. As per ANEEL # 407 /15/ the installed capacity has to be revised if the difference between the real and the authorized capacity is greater than 5%, that it is not the case of the mentioned SHPs. The reservoir area of Albano Machado SHP is 0.0893 Km² as per the updated installation License: LI number 03/2010- DL- issued by FEPAM, dated 04/01/2010 /18/. The reservoir area of Rio dos Índios SHP is 0.2526 Km² as per the updated installation License LI number 275/2010-DL - issued by FEPAM, dated 17/03/2010 (substitute the previous Installation License) /21/ .

During site visit at Albano Machado SHP, the following generators and turbines were verified:

Turbines (2 units):

Enebras Hydro

Potency: 1,566 KW

Serial numbers: 00006375 and 00006376

Generators (2 units)

Fabricant: Flessak Eletro Industria Ltda. Marca: General Electric, model A20c

Serial number: 79L1-1025, o.s.2146 and o.s. 2147 (serial number not informed in the equipment's plate)

Nominal Power 1,800 kVA

Effective Power: 1,530 kW

Cos φ: 0.85

Repowered : 01/2010

RINA has requested a clarification to PP regarding the generator plate that mentions that the equipment is "repowered". A letter from the Albano Machado manufacturer of the generators was provided to Rina /39/. The letter informs that the parts of the generator were from the Flessak stock and they were not used in other hydro power plant. Moreover the letter informs that the operational lifetime of the equipment is at least 30 years. Therefore, no leakage needs to be accounted.

For the SHP Rio dos Índios, the following equipments are described in the project design /38/:

Turbines (2 units)

Potency: 4,160 kW

Type: Francis

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Flow rate: 1.89 m³/s

Generators (2 units)

Nominal Power: 4,500 kVA

Power's Factor: 0.8889

Effective Power: 4,005 kW (4,500 kVA * 0.8889)

The project design engineering reflects current good practice; equipments described in the PDD were confirmed during the site visit through the equipments' plates (Albano Machado) and project design (Rio dos Índios).

The project proponent has not registered any small scale CDM projects in the last 2 years and the project boundary is not within 1 km radius of any other proposed small scale CDM project. Hence, the project activity is not a de-bundled component of a larger project activity.

The starting date of the project activity is 30/03/2009, based on generators contract for the SHP Albano Machado /48/. RINA has checked the evidences (/48/,/49/,/50/), where it is possible to confirm that the earliest date on which the project participants have committed to expenditures related to the implementation or related to the construction of the project activity is 30/03/2009, as per Glossary of CDM terms, version 5 /6/.

The expected operational lifetime of the project activity is 30 years (0 months), and deemed reasonable. The same period for which the ANEEL Authorization Resolution number 764, dated 12/12/2006 /13/ and ANEEL Authorization Resolution number 1826, dated 03/03/2009 /14/ are valid. Moreover, the operational lifetime was defined as per the ANEEL guidelines Study of economics useful life time and depreciation (from the Portuguese "*Estudo de Vida Útil Econômica e Taxa de Depreciação*"), dated November 2000 /28/.

Being a renewable electricity project, the project activity will generate GHG emission reductions by avoiding CO₂ emissions from electricity generation by fossil fuel power plant. A renewable crediting period of 7 years has been chosen for the project, starting from 01/07/2012, or the date of registration, whichever is later.

According to the PDD version 4, the total GHG emission reductions from the "SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)" are estimated to be 110,865 tCO₂e during the first renewable 7 years crediting period, resulting in annual average emission reductions of 15,838 tCO₂e / year.

The SHP Albano Machado has an Assured Energy /41/ equal to 1.66 MW (average), (resulting in a Plant Load Factor of 54.25 % = 1.66 MW / 3.06 MW) that was confirmed in the ANEEL/ MME Decree number 079/2007, dated 08/05/2007 /32/ that defined the assured energy for the Albano Machado SHP. Therefore, the average energy generated per year is forecasted to be 14,541.6 MWh/year (1.66 MW*365 days*24 hours).

The SHP Rio dos Índios, has an assured energy equal to 4.336 MW average (resulting in a Plant Load Factor of 54.13% = 4.336 MW/8.01 MW), that was provided by a third party company Rischbieter Engenharia e Serviço, in the project design /38/. Moreover PP has provided a copy of the letter sent the bank, dated 27/07/2010 /53/, that provides the same value of assured energy. Therefore, the average energy generated per year is forecasted to be 37,983 MW/year (4.336 MW* 365 days*24 hours). (Please, note that for the SHP RDI, at the time of the validation, the assured energy was not yet approved by ANEEL, but is also based on reliable information)

Therefore, the PLF for both SHPS is in accordance with the "Guidelines for the reporting and validation of Plant Load Factors" /52/.

It is important to highlight that the plant load factor is issued by ANEEL (Brazilian Electric Energy Agency), and the calculations were established in the Resolution number 169, of 3/05/2001 /42/. Historical data is used in the calculus and the plant load factor is specific for each power plant. The Assured Energy of an hydroelectric plant is issued by ANEEL (Brazilian Electric Energy Agency), and serves essentially two purposes:

- (i) to establish an upper limit for energy supply contracts (PPAs), and
- (ii) to define the share of each generating plant on the total amount of energy generated in the system by hydro plants.

The Assured Energy of the Brazilian electric system is defined as the maximum energy production that can be delivered almost continuously by hydroelectric plants throughout the years, simulating the occurrence of each one of the thousands of possibilities of statistically created flow sequences,

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admitting certain risk of not attendance to the load, that is, in determined percentile of the simulated years some rationing is allowed up to a limit considered acceptable by the system. The determination of the Assured Energy is associated to the conditions in the long term that each plant can supply to the system assuming an specific risk criteria of non-attendance to the market (risk of deficit), considering mainly the hydrologic variability to which the plant is submitted.

RINA was able to verify all the documented evidence listed above during the validation process and can confirm that data and considerations are complete and accurate.

RINA confirms that the description of the proposed CDM project activity, as contained in the PDD /1/ sufficiently covers all relevant elements, is accurate and complete and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.

3.4 Application of selected baseline and monitoring methodology

The project correctly applies the approved baseline and monitoring methodology AMS-I.D, "Grid connected renewable electricity generation", version 17 of 03/06/2011 /2/.

The project activity is applicable to type I of small-scale projects (renewable energy), methodology I.D. –Grid connected renewable electricity generation – since it is in compliance with the applicability requirements necessary for this methodology.

The assessment of the applicability criteria of AMS-I.D version 17 of 03/06/2011 is described bellow:

As per para.1 of AMS-ID version 17, "This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:

- Supplying electricity to a national or a regional grid; or*
- Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling".*

The proposed project activity comprises two renewable hydro power plants that will supply electricity to the Brazilian National grid. This has been verified during the site visit and found acceptable.

As per para. 2 of the methodology: "Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2"

As mentioned above, Rina verified during the site visit and in the Energy licenses /13//14/ that the Project will supply electricity to a national grid (item 1 of table 2 of AMS-I.D)

As per the para.3 of AMS-I.D version 17: "This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s)"

The project activity corresponds to Greenfield power plants, as it will be installed at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. This has been verified during the site visit and found acceptable.

Para.4: Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:

- The project activity is implemented in an existing reservoir with no change in the volume of reservoir;*
- The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²;*
- The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².*

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The project SHPs are Greenfield power plants, confirmed during the site visit, and results in new reservoirs with the Power Density (PD) greater than 4 W/m² (34.26 W/m² for Albano Machado and 31.71 W/m² for Rio dos Índios).

RINA has verified that the PDD was revised to present the installed capacity as per the equipments specifications and reservoir area as per the updated environmental licenses:

-Albano Machado Updated installation License: LI number 03/2010- DL- issued by FEPAM, dated 04/01/2010 /18/

-Rio dos Índios: Updated installation License: LI number 275/2010-DL - issued by FEPAM, dated 17/03/2010 (substitute the previous Installation License) /21/ .

Para.5 "If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW".

The criteria is not applicable to the project activity as only renewable component is used. The project activity involves only renewable components: SHPs Albano Machado (3.06 MW) and Rio dos Índios (8.01 MW), totalizing 11.07 MW, therefore below 15 MW eligible to this project category;

Para.6: "Combined heat and power (co-generation) systems are not eligible under this category".

Not applicable as there is no co-generation, the project activity is a Greenfield SHPs.

Para. 7: "In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units".

Not applicable, the project activity is a Greenfield SHPs.

Para.8: "In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW".

Not applicable, the project activity is a Greenfield SHPs.

RINA hereby confirms that the selected baseline and monitoring methodology has been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein.

3.5 Project boundary and baseline identification

3.5.1 Project boundary

According to the approved baseline and monitoring methodology AMS-I.D, "Grid connected renewable electricity generation", version 17 of 03/06/2011 /2/ *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.* For each SHP, the project boundary described in the PDD version 4 is the area where the project is located which includes the reservoirs, dams, powerhouses including the turbines, generators, substations, metering systems and the National Interconnected Grid. Therefore, the PDD has correctly described the project boundary, including the physical delineation of the project activity within the project boundary for the purpose of calculation the project and the baseline emissions for the proposed project activity.

As per the applied methodology, the baseline emissions corresponds to the emissions from electricity generation in fossil fuel power plants connected to the national grid that are displaced due to the project activity. There is no project emissions, since the power density of the SHP Albano Machado is 34.26 W/m² and SHP Rio dos Índios is 31.71 W/m², both greater than 10 W/m², project emission is regarded zero according to the approved methodology AMS-ID. Also, leakage does not need to be accounted in the project activity. Rina has summarized the emissions sources included in the project boundary in the table below:



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	GHGs involved	Description
Baseline emissions	CO ₂	Emissions from electricity generation in fossil fuel power plants connected to the national grid that are displaced due to the project activity
Project emissions	NA	Since the power density of the SHP Albano Machado is 34.26 W/m ² and SHP Rio dos Indios is 31.71 W/m ² , both greater than 10 W/m ² , project emission is regarded zero according to the approved methodology AMS-ID
Leakage	NA	There is no leakage that needs to be considered in applying this methodology.

Emission sources which are not addressed by the applied methodology and which are expected to contribute more than 1% of the overall expected average annual emissions reduction have not been identified.

By checking the information and the project site, RINA can confirm that the project boundary and emission sources described in the PDD are accurate and complete, and also that the selected sources and gases are justified for the proposed project activity

3.5.2 Baseline identification

The project has applied the baseline scenario as defined in the methodology AMS-I.D, "Grid connected renewable electricity generation", version 17 of 03/06/2011 /2/: *The baseline scenario is that the 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 generation sources into the grid.* RINA has confirmed during the site visit and through the environmental licenses /16/ to /21/ and energy (ANEEL) licenses /11/ to /14/ that the project activity is the installation of two small hydropower plants connected to the grid, therefore it is possible to confirm that the baseline scenario was defined as per the requirements of the applied methodology /2/. Moreover, in accordance with the applied methodology /2/, the baseline emissions are the product of electrical energy baseline (EG_{BL,y}) expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor. The project activity uses as source for the Emission Factor calculation the National Interconnected System (SIN) data for the operating and building margin, all data is public available and provided by the Designated National Authority (DNA) of Brazil /36/. The National Interconnected System (SIN) CO₂ Emission Factor is calculated based on generating records from the plants centrally operated by the National Electric System Operator (ONS), which includes thermoelectric plants that use fossil fuels as energy. RINA has verified in the Brazilian DNA web site that data is publicly available /36/. As per the Brazilian DNA web site, the emission factor is calculated according to the Tool to calculate the emission factor for an electricity system" /37/, using the dispatch data analysis, and is calculated considering all four regions connected (North, Northeast, South and Southeast-Midwest) /36/. The *ex-ante* estimative for the emission factor was calculated using the latest available emission factor of the Brazilian grid system for 2010 (= 0.30955 tCO₂/MWh, average OM=0.4787 tCO₂/MWh and BM=0.1404tCO₂/MWh) provided by the Brazilian DNA /36/. The emission factor will be updated *ex post* during the verification process.

. RINA can confirm that:

- All the assumptions and data used by the project participants are listed in the PDD, including their references and sources /36/;
- All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD /36/;
- Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable /36/;
- Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD/16/ to /21/;



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3.6 Additionality

The additionality of the project has been established applying the tool “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities” /7/. PP has applied the investment barrier.

RINA's opinion regarding the additionality of the proposed project is further explained in the following steps.

3.6.1 Prior consideration of the clean development mechanism

The starting date of the project activity is 30/03/2009, based on generators contract for the SHP Albano Machado /48/. PPs have included in the revised PDD version 4, the timeline for both SHPs implementation, including the equipments purchase (table 4 of the PDD). RINA has checked the evidences (/48/,/49/,/50/), where it is possible to confirm that the earliest date on which the project participants have committed to expenditures related to the implementation or related to the construction of the project activity is 30/03/2009, as per Glossary of CDM terms, version 5 /6/. (Observation: the PP did not start equipments' acquisition for the SHP Rio dos Índios /50/)

As per the *Guidelines on the demonstration and assessment of prior consideration of the CDM* /5/, project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. RINA has confirmed that the prior consideration of the CDM is available on the UNFCCC website. Notification was done on 19/12/2008 for both SHPs /47/, within six months of the project activity start date. Rina has confirmed that the specif data for each SHP was sent in one email to UNFCCC and in the UNFCCC web page there is one CDM consideration (page) for each SHP separately.

At the time of the EB notification, the Guidance on the demonstration and assessment of prior consideration of the CDM, version 1 (EB 41, annex 46) was valid. Brazilian DNA was notified on 21/09/2009, including the explanation that the forms were sent to EB in accordance with the requirements of EB 41, annex 46. The DNA has accepted the email and justification from the client (email from Mr. Arthur Moraes to CIMGC-MCT, dated 21/09/2009, CIMGC-MCT response have the same date) /29/.

In addition PPs have presented in the timeline of the project activity the continuous and real actions to secure the CDM status of the project activity as DOE offer to validate the project activity on (01/12/2009) /51/, local stakeholder consultation on 02/12/2009 (letters sent to stakeholders /33/), PDD published for global stakeholder consultation on 22/04/2010 (start of the validation process).

In conclusion, in accordance with the requirements of the Guidance on the demonstration and assessment of prior consideration of the CDM /5/ and VVM //3/, RINA can confirm that the CDM was considered seriously in the decision to implement the project activity.

3.6.2 Identification of alternatives

According to the VVM v.1.2 para. 105 “*The PDD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required.* Based on this information, the selected baseline scenario to the project activity as per the AMS-I.D is defined as “*The baseline scenario is that the 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 generation sources into the grid*” The selected baseline scenario complies with the National requirements of ANEEL (Brazilian Electricity Regulatory Agency) and FEPAM (Rio Grande do Sul environmental agency).

3.6.3 Investment analysis

To demonstrate the Investment barrier, PP has considered the investment analysis, as described in the sections bellow.



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3.6.3.1 Choice of approach

The benchmark analysis was done in accordance with the Guidelines on the assessment of investment analysis, version 5 /43/. Among the three options available for investment analysis as discussed in the "Tool for the demonstration and assessment of additionality"/69/, project participants have chosen the benchmark analysis since the other two are not applicable. The simple cost analysis is not applicable because the project will generate financial and economic benefits (from electricity sales) other than CDM related income. The investment comparison analysis is not applicable either because the only alternative to the project activity is the supply of electricity from a grid, which is not to be considered a similar investment project.

3.6.3.2 Benchmark selection

In Brazil there is not a widely accepted benchmark for SHPs projects nor does the Government require a minimum profitability in projects of this kind. The project IRR (internal rate of return) was compared with the yield on Government Bonds. Project participants have chosen a Brazilian Government Bond named National Treasury Notes, Series C (NTN-C), with maturity for January 1st, 2031. It is placed on the market by the Brazilian National Treasury by a Public Offering and its profitability is linked to Inflation by the IGP-M Index.

In the PDD version 1, it was considered as the yield of paper the value quotation in one day for one year (01/08/2009). Project participants added to the paper day quotation the average IGPM between 1999 and 2008. PP were addressed that this represents a misalignment of information, with sums of values that do not represent the same period of time. In addition, taking into account that Brazil does not have a fully stabilized economy and some inflation, an index like IGP-M (that is linked to the profitability of the NTN-C) had a non-linear behavior in the last ten years, project participants were requested to consider a longer period for the calculation of yield average, considering yearly averages and not quotation for specific days.

The PDD was revised accordingly. PP provided the benchmark based on average of 5 entire years before the starting date of the project activity (January 2004 to December 2008), therefore available at the time of investment decision. The reports are publicly available by the Brazilian Government /30/. The performed calculation resulted in an average yield of 17.13% per year. Rina has cross-checked all evidences stated in the spreadsheet "*Government bond rates_v2.xls*" /30/. The Brazilian government bonds presented by project participants as the project benchmark is a popular and publicly investment option and it is defined by international rating agencies as Investment Grade Bond. It is considered as low risk investment if it is compared to an investment in a hydro power plant. Furthermore this bond profitability is linked to the IGP-M (General Index of Market Prices) that is the main inflation index for industrial costs in Brazil. Therefore, the benchmark is in accordance with the "tool for the demonstration and assessment of additionality", "paragraph 6" of "sub-step 2b" and VVM v.1.2 para 112. The benchmark applied is suitable for the type of financial indicator presented and the benchmark is conservative since it is a Brazilian Government Bond, publicly available.

Moreover, in the revised documents, for conservativeness PP has excluded the risk premium presented in the PDD version 1. Both benchmark and IRR analysis includes the inflation index.

The summary of the values of the benchmark applied in the published PDD and the version 4 is presented in the table below:

PDD version	NTN-C	Risk Premium	Benchmark value	Related documents
01 of 11/11/2009	17.34	1.27	18.61%	" <i>Government bond rates.xls</i> ", version 1/30/
version 4 of 17/01/2012	17.13 %	-----	17.13%	" <i>Government bond rates_v2.xls</i> ", version 2 /30/



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3.6.3.3 Input parameters

RINA conduct a thorough assessment of the parameters and assumptions used in the financial analysis and cross checked the parameters against third party or publicly available resources. The input parameters used in the financial analysis have been assessed as presented below:

- the assessment of the sources and input parameters used in the financial analysis has been carried out against third party or publicly available (independent) sources as detailed in the following paragraphs;
- the parameters used in the financial analysis and included in the PDD have been compared with the parameters stated in the third party or publicly available (independent) sources and RINA can confirm that the values applied are consistent with the values stated in those sources;
- as detailed in the following paragraphs the data used in the financial analysis were available at the time of the investment decision.

For more transparency the following assessment has been conducted.

All parameters and assumptions applied on investment analysis, as well as their respective cross-checking are summarized on table below:

Albano Machado SHP

Investment	14,070,472	R\$	OPE - Budget Standard Eletrobrás /23/ and Rischbieter Engenharia e Serviços SHP Project Design /55/
Installed Power	3.00 MW	MW	Project Design /55/ and ANEEL Resolution number 764 /13/
Assured energy	1.66	MWaverage	ANEEL/ Brazilian Mines and Energy Ministry Decree number 079/2007 /32/
Net Generated electricity per year	14,541.6	MWh/year	ANEEL/ Brazilian Mines and Energy Ministry Decree number 079/2007 /32/ (=1.66 MW*365days*24hours)
Energy Value	155.00	R\$/MWh	Project Proponent Benchmark, based on market forecasts (according to the e-mail document "Fwd Cotação de energia.msg", dated 24/03/2009) /31/ and energy auction, confirmed in the Energia Direta website /54/.
Pis (Brazilian tax)	0.65	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Cofins (Brazilian tax)	3.00	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Base Value for the IR calculation (Brazilian tax)	8.00	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Base Value for the Social Contribution calculation	12.00	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
IR - Income Taxes	15.00	% (on base value)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Social Contribution-CSLL	9.00	% (on base value)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Additional IR	10.00	% (on base value)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Exchange rate	2.3784	US\$ x BRL	Brazilian Central Bank, available at 27/02/2009 /57/
O&M	2.40	% over the	PP Benchmark presented in the Board's meeting dated



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		total asset	06/01/2009 /62/ and "Directions for Small Hidro Power Plants studies and projects" (from the Portuguese: " <i>Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas</i> ") (5.0% of the investment) /63/
Distribution fee (TUSD) - "encumbrance"	0.52	R\$/MWh	ANEEL Resolution number 636, of 17/04/2008 Annex II Frames P and T /59/
Distribution Use of System Charge - TUSD	1.60	R\$/KWh	ANEEL Resolution number 636, of 17/04/2008 Annex II Frames P and T /59/
Annual Fee for Connection to the Distribution System - CCD	12,000	R\$	Standart of RGE (R\$ 1,000/month) . Based on PPs experience (this value is not relevant for the analysis)
System Services Encumbrance - ESS	0.5023	R\$/MWh	Historical average of the South sub-system/71/
ANEEL - Fiscalization fee	4,969.95	R\$/ year	Law 9427/1996, Decree 2410/1997./70/
Other Costs (included Insurance - engineering risk, operational risk and performance guarantee, etc)	2.00	% over the total asset	PP Benchmark presented in the Board's meeting dated 06/01/2009 /62/
Inflation Index (IGPM)	4.50	% per year	Central Bank of Brazil report /58/
Inflation Index (IPCA)	4.50	% per year	Central Bank of Brazil report /58/
Residual	40	% over the total asset	ANEEL Guidelines Study of economics useful life time/ depreciation (from the Portuguese " <i>Estudo de Vida Útil Econômica e Taxa de Depreciação</i> "): 50 years for the Turbines and Generators equipment./28/ Eletrobras document: SHP Projects Guidelines ("Diretrizes para Projetos de PCH – Chapter 4 item 4.4.4") /61/

Rio dos Índios SHP

Investment	36,745,269.82	R\$	OPE - Budget Standard Eletrobrás"/25/ Project Proponent's Letter to the BRDE /53/ (this letter shows a higher investment and is used for comparison only, conservative value is applied)
Installed Power	8.0	MW	ANEEL Authorization Resolution number 1826, dated 03/03/2009 /14/
Assured energy	4.336	MW/average	Rischbieter Engenharia e Serviço project design /38/ and letter sent the bank, dated 27/07/2010 /53/
Net Generated electricity per year	37,983.4	MWh/year	ANEEL/ Brazilian Mines and Energy Ministry Decree number 079/2007 /32/ (=4.336 MW*365days*24hours)
Energy Value	155.00	R\$/MWh	Project Proponent Benchmark, based on market



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			forecasts (according to the e-mail document "Fwd Cotação de energia.msg", dated 24/03/2009) /31/ and energy auction, confirmed in the Energia Direta website /54/.
Pis (Brazilian tax)	0.65	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Cofins (Brazilian tax)	3.00	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Base Value for the IR calculation	8.00	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Base Value for the Social Contribution calculation	12.00	% (on gross revenue)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
IR - Income Taxes	15.00	% (on base value)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Social Contribution-CSLL	9.00	% (on base value)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Additional IR	10.00	% (on base value)	Brazilian Law 10.637/2002 and 9.718/1998 /56/
Exchange rate	1.7658	US\$ x BRL	Brazilian Central Bank dated 15/04/2009 /57/ (As PP did not start the construction nor equipments purchase, PP has used a dollar quotation before the PDD publication)
O&M	2.40	% over the total asset	PP Benchmark presented in the Board's meeting dated 06/01/2009 /62/ and "Directions for Small Hidro Power Plants studies and projects" (from the Portuguese: " <i>Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas</i> ") (5.0% of the investment) /63/
Distribution fee (TUSD) - "encumbrance"	0.38	R\$/MWh	ANEEL Resolution number 848, dated 14/07/2009 /60/(As PP did not start the construction nor equipments purchase, PP has used a the resolution available before the PDD publication)
Distribution Use of System Charge - TUSD	1.07	R\$/KWh	ANEEL Resolution number 848, dated 14/07/2009 /60/
Annual Fee for Connection to the Distribution System - CCD	12,000	R\$	Standart of RGE (R\$ 1,000/month). Based on PPs experience (this value is not relevant for the analysis)
System Services Encumbrance - ESS	0.5023	R\$/MWh	Historical average of the South sub-system/71/
ANEEL - Fiscalization fee	13,253.20	R\$/ year	Law 9427/1996, Decree 2410/1997/70/.
Other Costs (included Insurance - engineering risk, operational risk and	2.00	% over the total asset	PP Benchmark presented in the Board's meeting dated 06/01/2009 /62/



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performance guarantee, etc)			
Inflation Index (IGPM)	5.0	% per year	Central Bank of Brazil report /58/
Inflation Index (IPCA)	4.8	% per year	Central Bank of Brazil report /58/
Residual	40	% over the total asset	ANEEL Guidelines Study of economics useful life time/ depreciation (from the Portuguese " <i>Estudo de Vida Útil Econômica e Taxa de Depreciação</i> "): 50 years for the Turbines and Generators equipment./28/ Eletrobras document: SHP Projects Guidelines ("Diretrizes para Projetos de PCH – Chapter 4 item 4.4.4") /61/

All the indicated input parameters used in the financial analysis have been cross-checked as described below:

Investment: The Albano Machado SHP is a R\$ 14,070,472.78 of investment and the Rio dos Índios SHP is a R\$ 36,745,269.82 of investment, for both projects the investment is divided in 2 years, 20% in the first year and 80% in the second year (that is the first year of operation).

For Albano Machado, the investment cost comes from the Eletrobrás Standard Budget (*Orçamento Padrão Eletrobrás-OPE*). The whole detail of the investment of 14,070,472.78 is presented the spreadsheet "OPE PCH ALBANO MACHADO 10 12 08_R01-RISCHBIETER.xls reference date 09/02/2009 /23/. Another evidence to the investment value is the page 2 of the Chapter 14 item 14.1 of the Project Design delivered to the ANEEL and developed by the "*Rischbieter Engenharia e Serviços*" (Third Party company and the project designer expert) /55/ which present the investment value as the same contained in the OPE spreadsheet.

For the SHP Rio dos Índios, the investment cost of R\$ 36,745,269.82 comes from the Eletrobrás Standard Budget (*Orçamento Padrão Eletrobrás-OPE*) /25/. RINA has verified that the investment of R\$ 40,984,586.00 is presented in a letter sent to the Bank for financing the project, dated 27/07/2010 /53/. Therefore, the investment of R\$ 36,745,269.82 used in the financial analysis is a conservative value.

The investment costs were also compared to the average construction costs of SHPs in Brazil, and the project activity has a proper and conservative correspondence with the R\$ 5 million/ installed kW to R\$ 5.5 million/ installed kW found in the literature /64/

A salvage value (residual) of 40% of the total investment was correctly applied in the last year of the financial analysis. The calculus of the residual value was based on the Eletrobras document: SHP Projects Guidelines ("Diretrizes para Projetos de PCH – Chapter 4 item 4.4.4") /61/ that describes that the economic lifetime possible is 50 years. So in a conservative approach it was adopted after 30 years a Residual Value with 40% of the Initial Investment ($100\% / 50\text{years} = 2\%$ per year depreciation rate so for 30 years = 60% of the initial value depreciated).

Installed Power: the authorized installed capacity for Albano Machado is 3 MW and for Rio dos Índios is 8 MW, according to ANEEL Authorization Resolution number 764, dated 12/12/2006 /13/ and ANEEL Authorization Resolution number 1826, dated 03/03/2009 /14/, respectively.

Considering the technical description of the equipments, the Albano Machado and Rio dos Índios power plants have an installed capacity of 3.06 MW and 8.01 MW, respectively. The installed capacity of Albano Machado was confirmed during site visit through the equipments' plates. For the Rio dos Índios SHP, as the equipments were not installed during the site visit, RINA confirmed that the equipments described in the PDD are according to the ones presented in the Project Design, rev 02 /38/. The project design was provided by a third party company Rischbieter Engenharia e Serviço /38/. As per ANEEL # 407 /15/ the installed capacity has to be revised if the difference between the real and the authorized capacity is greater than 5%, that it is not the case of the mentioned SHPs. Therefore, the use of the authorized installed capacity in the financial spreadsheet is applicable. The sources used in the financial analysis assessment (input values cross checks) are independent, credible and the values applied are consistent with the values stated in those sources. Input values used are considered valid and applicable at the time of the investment decision taken by the project participant.



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Plant Load Factor: For the Albano Machado SHP, the amount of energy presented in the IRR spreadsheet /9/, 14.541 MW/year, is based on the net power (assured energy= 1.66 MW average) that is approved by the ANEEL/MME Decree number 079/2007, dated 08/05/2007) /32/. Consequently, the Plant Load Factor of Albano Machado SHP is 54.25 % (= 1.66 MW / 3.06 MW).

For the Rio dos Índios SHP, the amount of energy presented in the IRR spreadsheet, 37,983 MW/year, /10/ is based on the net power (assured energy= 4.336 MW average), that was provided by a third party company Rischbieter Engenharia e Serviço, in the project design /38/. Moreover PP has provided a copy of the letter sent the bank, dated 27/07/2010 /53/, that provides the same value of assured energy. Consequently, the Plant Load Factor of Rio dos Índios SHP is 54.13% (= 4.336 MW/8.01 MW). Therefore, the PLF for both SHPS is in accordance with the "Guidelines for the reporting and validation of Plant Load Factors" /52/. The sources used in the financial analysis assessment (input values cross checks) are independent, credible and the values applied are consistent with the values stated in those sources. Input values used are considered valid and applicable at the time of the investment decision taken by the project participant.

Energy price: for both projects, 100% of electricity generated will be traded by a stabled price at R\$ 155.0 / MWh. This price was based on market forecasts (according to the e-mail document "Fwd Cotação de energia.msg", dated 24/03/2009) /31/. Moreover in the in the action of 2009, as can be confirmed in the energy web site (Energia Direta), the initial energy price was 145.00 R\$/MWh and for 2010, 147.00 R\$/MWh /54/.

The sources used in the financial analysis assessment (input values cross checks) are independent, credible sources and the values applied are consistent with the values stated in those sources. Input value used is considered valid and applicable at the time of the investment decision taken by the project participant.

Taxes (PIS, COFINS, Income tax and Social Contribution):

The Brazilian law 10.637 from 30 December 2002 and the law 9.718 from 27 November 1998 /56/ defined that companys with Gross revenue less than R\$ 48 million can apply the Brazilian System of tax "Presumed tax profit".

So, the following taxes is applied in the gross revenue:

- COFINS (Contribuição para o Financiamento da Seguridade Social) – 3% over the Gross Profit;
- PIS/PASEP (Programa de Integração Social/ Programa de Formação de Patrimônio do Servidor Público) – 0,65% over the Gross Profit;
- Income tax – 25% over 8% over the Gross Profit;
- Social contribution – 9% over 12% in the Gross Profit.

Additional Income tax is applied over the profit exceeding R\$ 240,000

The taxes values employed by project participants were cross checked against Brazilian Federal Laws, issued by Presidency of Republic of Brazil.

Project participants didn't include the depreciation in the financial calculations spreadsheet however there is no impact on Income Tax calculations because project participants have opted for the Presumed Profit Tax System, where the Income Tax and the Social Contribution are calculated over the Gross Sales and not over the Profit.

The sources used in the financial analysis assessment (input values cross checks) are credible and the values applied are consistent with the sources. Input values used are considered valid and applicable at the time of the investment decision taken by the project participant.

Exchange rate and inflation index (IGPM and IPCA): the exchange rate adopted (2.3784 US\$ x BRL for Albano Machado and 2.200 US\$ x BRL for the Rio dos Indios) is in line with the Brazilian Central Bank web site /57/,. Moreover, the inflation index is also provided by the Brazilian Central Bank, report from 06/03/2009, IGPM and IPCA forecast is 4.50% per year /58/.

The sources used in the financial analysis assessment (input values cross checks) are credible and the values applied are consistent with the sources. Input value used is considered valid and applicable at the time of the investment decision taken by the project participant.



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O&M: 2.40 % (includes operators and maintenance personnel salaries, general materias, communication systems, contability, administrative costs, representation and metering costs, basic maintenance, schedule maintenance) over the total asset and **Other Costs** (included Insurance - engineering risk, operational risk and performance guarantee, etc): 2.00 % over the total asset. PP Benchmark presented in the Board's meeting dated 06/01/2009 /62/ and "Directions for Small Hidro Power Plants studies and projects" (from the Portuguese: "*Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas*") (5.0% of the investment) /63/. Rina verified in the board's meeting that the same values are applied in another SHP of the group. It is RINA's opinion that the values are reasonable for this kind of projects in Brazil and the value applied is similar to other hidro power plants such as registered projects EB ref. 2703 and 3669.

Energy sector fees: the ANEEL fiscalization fee (TFSEE- Inspection Tax Electric Energy Services): 4,969.95 R\$ per year for Albano Machado and 13,253.20 R\$ per year for Rio dos Índios. The value of 331.33 R\$/kW used in the calculus is in line with ANEEL Dispatch 2268/2005 and the ANEEL fee of 0,50% - is in line with Brazilian Law # 9427, dated 26/12/1996. Moreover, the calculus considers the installed capacity of the SHP. The value of distribution fee and distribution use of system charge (TUSD) for Albano Machado analysis is in line with ANEEL Resolution number 636, dated 17/04/2008 /59/ and for Rio dos Índios analysis is in line with ANEEL Resolution number 848 dated 14/07/2009 /60/.

The values of TFSEE, ANEEL fee and TUSD were cross checked with documents provided by ANEEL (Brazilian Electric Energy Agency). The sources used in the financial analysis assessment (input values cross checks) are independent, credible and the values applied are consistent with the values stated in those sources. Input values used are considered valid and applicable at the time of the investment decision taken by the project participant.

The investment period is coherent with the project operational lifetime of 30 years /39/

3.6.3.4 Calculation and conclusion

The initial analysis presented in the PDD version 1 was revised to include the prices and costs evolution over the years. The inflation on prices and costs was considered because in the benchmark chosen the return of the investment includes the inflation. As described above, the inflation indexes IGP-M and IPCA were obtained in the Brazilian Central Bank reports.

The summary of the values of the IRR calculation presented in the published PDD and the version 4 is presented in the table below:

PDD version	Albano Machado IRR	Rio dos Índios IRR
1 of 11/11/2009	11.97%	12.80%
version 4 of 17/01/2012	14.59 %	14.65%

The difference among the versions is due mainly by the correction of financial analysis to consider the inflation, in order to be coherent with the chosen benchmark that also considers inflation. The O&M also were revised to comply with the evidences provided /62//63/.

Based on the information verified, RINA was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project activity at the time of the investment decision.

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3.6.3.5 Sensitivity analysis

A sensitivity analysis was carried out for the parameters that contributes more than 20% of the cost/investment for determining under what conditions variations in the result would occur and the likelihood of these conditions, as presented bellow.

Albano Machado

	Original Value	Breakeven Point	Original IRR	% of deviation	Benchmark
Investment (R\$)	14,070,472.00	11,537,787.04	14.59	-18.00	17.13%
Energy Price (R\$/MWh)	155.00	178.10	14.59	+ 14.90	17.13%
Plant Load Factor MW average (assured energy)	1.66	1.91	14.59	+ 14.90	17.13%
O&M (% on total assesst)	2.40	0.16	14.59	-93.18	17.13%

Rio dos Indios

	Original Value	Breakeven Point	Original IRR	% of deviation	Benchmark
Investment (R\$)	36,745,269.82	30,204,611.79	14.65	-17.80	17.13%
Energy Price (R\$/MWh)	155.00	178.10	14.65	+14.90	17.13%
Plant Load Factor MW average (assured energy)	4.336	4.928	14.65	+13.65	17.13%
O&M (% on total assesst)	2.40	0.17	14.65	-92.97	17.13%

As can be seen, for all parameters it was necessary more than 10% of deviation to achieve the break even point (to reach the benchmark). For instance, the Plant Load Factor can not increase (it is limited by the defined ANEEL's Assured Energy) and it is based on well established calculus and formulas for these kind of project activity and also is based on the historical flow river where the SHPs shall be located /32//38//53/; for the energy price, PP has already used conservative values (optimistic/higher value than current ones) /31//54/, as described above and it is not likely to increase 14.90%; the investment was based on Eletrobrás Standard Budget, which considers reliable source of data and it is not likely to decrease; for instance, for the SHP Rio dos Indios, a higher value of investment was requested to the bank /53/, it can be considered that the input value for investment costs used in the financial analysis is adequate/suitable as well as conservative, considering that it reflects the input value presented at the time of validation; and for the O&M costs, it is not likely to decrease more than 92.97%. In all scenarios, the project's IRR is unlikely to reach the benchmark and RINA verified that PP has done the investment analysis in a conservative manner.

In RINA's opinion, the investment analysis has been done correctly and demonstrates that the project activity is unlikely to be financially/economically attractive.

3.6.4 Barrier analysis

PP has applied the the Investment barrier. Please refer to the section 3.6.3

3.6.5 Common practice analysis

PP has applied the the Investment barrier. Please refer to the section 3.6.3

3.6.6 Conclusion

RINA can confirm that all data, rationales, assumptions, justifications and documentation provided by the project participants to support demonstration of additionality are credible and reliable.

By assessing the evidences presented and cross-checking the information, RINA considers that the reasoning for the proposed project additionality demonstration is credible and reasonable, i.e. the

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proposed project activity has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the proposed CDM project activity.

3.7 Monitoring Plan

The approved baseline and monitoring methodology AMS-I.D, "Grid connected renewable electricity generation", version 17 of 03/06/2011 /2/ has been correctly applied.

The monitoring plan is in accordance with the monitoring methodology and will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodology and no deviations relevant to the project activity have been found.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported *ex post* and verified.

3.7.1 Parameters determined ex-ante

The following parameters are available at validation:

$Cap_{Albano\ Machado, y}$ and $Cap_{Rio\ dos\ Indios, y}$ (Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero): 0 W

$A_{Albano\ Machado, y}$ and $A_{Rio\ dos\ Indios, y}$ (Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero): 0 m^2

3.7.2 Parameters monitored ex-post

The following parameters will be monitored:

* $EG_{Albano\ Machado, y}$ - Net Electricity supplied by the SHP Albano Machado to the grid in hour h ;

* $EG_{Rio\ dos\ Indios, y}$ - Net Electricity supplied by the SHP Rio dos Índios to the grid in hour h ;

* $EF_{grid, CM, y}$ - Brazilian grid emission factor;

* $EF_{grid, OM-DD, y}$ - CO₂ Operating Margin emission factor of the grid, in a year y ;

* $EF_{grid, BM, y}$ - CO₂ Build Margin emission factor of the grid, in a year y ;

* $Cap_{Albano\ Machado, y}$ - Installed capacity of the hydro power plant (SHP Albano Machado) after the implementation of the project activity;

* $Cap_{Rio\ dos\ Indios, y}$ - Installed capacity of the hydro power plant (SHP Rio dos Índios) after the implementation of the project activity;

* $A_{Albano\ Machado, y}$ - Area of the reservoir measured in the surface of the water, after the implementation of the project activity (SHP Albano Machado), when the reservoir is full;

* $A_{Rio\ dos\ Indios, y}$ - Area of the reservoir measured in the surface of the water, after the implementation of the project activity (SHP Rio dos Índios), when the reservoir is full.

3.7.3 Management system and quality assurance

FAR #1: At the time of site visit, the project was being implemented and procedures were not available. In the first verification it shall be checked training courses provided to the operational team and if data archiving and data collection procedures are properly described and implemented.

It has been described in the PDD /1/ that the energy delivered to the grid will be measured and recorded continuously (hourly reading and recorded monthly) through electricity meters that complies with national standards. The National Grid Operator (ONS) and Electric Power Commercialization Chamber (CCEE) are responsible for the definition of the technical requirements of energy measurements for billing. The indicated QA/QC procedures are in line with the applied methodology. The electricity supplied to the grid will be monitored by electronic calibrated and inviolable (sealed)

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energy meters (principal and backup). The data from the energy meters will be cross checked with the invoices of energy sales and/or with the sheet from CCEE.

Meters' calibration procedures (frequency) will follow the ONS "Grid Procedures": Module 12, Sub-module 12.2 Installation of the Measurement System for Billing. The procedure is available at the ONS web site /35/.

The Area of the reservoir (A_{PJ}) will be measured annually through the topographical surveys, maps, satellite pictures, etc. The facility capacity ($Cap_{PJ,y}$) will be measured annually through the technical specifications on the installed equipments.

The combined margin emission factor ($EF_{grid,CM,y}$) will be calculated *ex-post* using the CO₂ emission factors for the build margin and the operational margin that are provided by the Brazilian DNA. CO₂ emission factors for the build margin and the operational margin for electricity generation in Brazil's National Interconnected System (SIN) are calculated, according to the dispatch analysis, from generation records of plants dispatched in a centralized manner by the National Electric System Operator (ONS).

Monitoring plan establishes that all data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Regarding the responsibilities, issues regarding the SHPs will be treated by the SPEs (Special Purpose Entities) Rio do Lobo Energia Ltda. and Casa de Pedra Energia S.A board and the Management Sector responsible.

3.8 Estimation of GHG emissions

The formulas and factors used in the project's emissions calculations are in accordance to the approved baseline and monitoring methodology AMS-I.D - "Grid connected renewable electricity generation", version 17 of 03/06/2011 /2/. Neither project's emissions nor leakage are applicable to the project activity.

All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration, and the mentioned data sources have been verified by RINA.

Ex-ante calculation of emission reductions

The estimated net electricity generation supplied by the project plant to the grid was calculated based on the assured energy (1.66 MW (average) /41/ for SHP Albano Machado and 4.336 MW (average) /38/ for SHP Rio dos Indios). Moreover, the *ex-ante* estimative for the emission factor was calculated using the latest available emission factor of the Brazilian grid system for 2010 (= 0.30955 tCO₂/MWh, average OM=0.4787 tCO₂/MWh and BM=0.1404 tCO₂/MWh) provided by the Brazilian DNA, and considering all four regions connected (North, Northeast, South and Southeast-Midwest) - calculated according to the Tool to calculate the emission factor for an electricity system /36/. The emission factor will be updated *ex post*.

Ex-post calculation of emission reductions

The combined margin emissions factor ($EF_{grid,CM,y}$) will be calculated *ex-post* using the CO₂ emission factors for the build margin and the operational margin that are provided by the Brazilian DNA. CO₂ emission factors for the build margin and the operational margin for electricity generation in Brazil's National Interconnected System (SIN) are calculated, according to the dispatch analysis, from generation records of plants dispatched in a centralized manner by the National Electric System Operator (ONS).

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3.9 Environmental Impacts

The project complies with all applicable laws and regulations. The environmental aspects of the project activity were analyzed by the environmental agency (FEPAM- Fundação Estadual de Proteção Ambiental- Environmental Protection State Foundation). No transboundary impacts are foreseen.

The project obtained the following environmental license, assessed by RINA:

SHP Albano Machado:

- Preliminary License: LP number 703/2004-DL – issued by FEPAM, dated 03/09/2004 /16/
- Installation License: LI number 878 /2009-DL – issued by FEPAM, dated 10/08/2009 /17/
- Updated installation License: LI number 03/2010- DL- issued by FEPAM, dated 04/01/2010./18/

SHP Rio dos Índios:

- Preliminary License: LP number 307/2004-DL – issued by FEPAM, dated 23/04/2004./19/
- Installation License: LI number 375/2008-DL – issued by FEPAM, dated 22/04/2008./20/
- Updated installation License: LI number 275/2010-DL - issued by FEPAM, dated 17/03/2010 (substitute the previous Installation License) /21/

Moreover, the following ANEEL (Brazilian Electricity Regulatory Energy Agency) documents were assessed:

Albano Machado:

- *ANEEL Dispatch number 3,761, dated 05/10/2009 /11/
- *ANEEL Authorization Resolution number 764, dated 12/12/2006 /13/

Rio dos Índios:

- *ANEEL Dispatch number 3,473 dated 19/08/2009 for Rio dos Índios SHP /12/
- * ANEEL Authorization Resolution number 1,826, dated 03/03/2009 /14/.

3.10 Local stakeholders consultation

Prior to the publication of the PDD on the UNFCCC website, from 22 April 2010 to 21 May 2010, the Project owner performed the local stakeholder consultation as per required by the Interministerial Commission on Global Climate Change (CIMGC) and in accordance to the Resolution 7 of the Brazilian DNA (05 March 2008) /34/. The project participants sent letters, inviting for comments, to the following stakeholders/City authorities /33/:

- City Hall of Nonoai
- Hall of Councilors of Nonoai
- Department of Planning, Development, Industry, Commerce and Tourism of Nonoai
- Department of Public Works of Nonoai
- Municipal Service Center for Children and Teenagers Adílio Daronch - CEMACAAAD
- Chamber of Commerce, Cultural, Industrial, Services and Agriculture of Nonoai
- City Hall of Trindade do Sul
- Hall of Councilors of Trindade do Sul
- Department of Agriculture of Trindade do Sul
- Cooperative of Agricultural Production in Trindade do Sul
- Brazilian Forum of NGOs and Social Movements for Environment and Development (FBOMS)
- State Foundation of Environmental Protection - FEPAM
- Public Ministry of State of Rio Grande do Sul
- Prosecutor's Office in the State of Rio Grande do Sul

Excluding the FBOMS letter receival confirmation, AR (Aviso de Recebimento = “Receiving acknowledgment receipt”) dated January/2010, all others stakeholders received the letters on December/2009 /33/.

It was verified that the letters sent to the stakeholders followed the Brazilian DNA Resolution nº 7 /34/. Letters were sent in Portuguese and PDD was made publicly available, in Portuguese, in the following web link: www.carbotrader.com/jun1115dcp.pdf. No comments were received.



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RINA can confirm that the process is adequate and credible for local stakeholder consultation and in compliance with the Brazilian requirements in place for the local stakeholder consultation.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 01 of 11/11/2009 /1/ was made publicly available on the CDM UNFCCC website (<http://cdm.unfccc.int/Projects/Validation/DB/WJNOGITOZTPB8NKK4JD63XIO1QUDD/view.html>) and Parties, stakeholders and NGOs were invited to provide comments during a 30 days period from 22 April 2010 to 21 May 2010. No public comments were received during that period.



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5 VALIDATION OPINION

RINA Services S.p.A. (RINA) has performed the validation of the project activity “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” in Brazil, with regard to the relevant requirements for CDM activities.

The review of the project design document and the subsequent follow-up interviews have provided RINA with sufficient evidence to determine the fulfillment of the stated criteria.

The host Party, Brazil, fulfills the requirements to participate in the CDM. No Annex I party has yet been identified. The project participant(s) are Carbotrader Assessoria e Consultoria em Energia Ltda., Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A from Brazil.

The project correctly applies the approved baseline and monitoring methodology AMS-I.D, “Grid connected renewable electricity generation”, version 17 of 03/06/2011.

By generating renewable energy from hydropower plant the project results in reduction of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. 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 GHG emission reductions from the “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” are estimated to be 110,865 tCO₂e during the first renewable 7 years crediting period, resulting in an annual average emission reductions of 15,838 tCO₂e / year. The emission reduction forecast has been checked and it is deemed likely the stated amount is achieved given that the underlying assumption does not change.

The monitoring plan sufficiently specifies the monitoring requirements for the monitoring of the project's emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is RINA's opinion that the project participants are able to implement the monitoring plan.

In conclusion, it is RINA's opinion that the project activity “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” in Brazil, as described in the PDD version 4 of 17/01/2012, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AMS-I.D, “Grid connected renewable electricity generation”, version 17 of 03/06/2011.

Prior to the submission of the Request for Registration 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.

APPENDIX A

VALIDATION PROTOCOL

TABLE 1 MANDATORY REQUIREMENTS

Requirement	Reference	Conclusion
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reductions commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non Annex I Parties contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art.12.5a CDM Modalities and Procedures §40a	--
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art.12.2 CDM Modalities and Procedure §40	OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance (ODA) and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7 CDM Modalities and Procedures Appendix B §2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities and Procedures §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedure §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedure §31b	OK
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedure §43	CAR 5, CAR 6, CAR 7, CAR 8, CAR 9, CAR 10, CAR 11, CL 6, CL 7, CL 8, CL 9, CL 10
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art.12.5b	OK
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech Accords and shall not be a de-bundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK
13. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK

Requirement	Reference	Conclusion
14. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK.
15. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30/45 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
17. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel.	CDM Modalities and Procedures §37e	OK
18. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §47	OK
19. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords, and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

TABLE 2 REQUIREMENTS CHECKLIST

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
A. General Description of Project Activity						
A.1. Title of the project activity						
A.1.1.	Title of the project activity, version number and date of the PDD (section A.1).	/1/	DR	The title of project activity is “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)”, as per the published PDD version 01 of 11/11/2009.		OK
A.1.2.	Does the project comply with the applicable requirements for completing the PDDs?	/1/ /4/	DR	PDD is in accordance with the “Guidelines for completing the simplified project design document (CDM-SSC-PDD) and the form for proposed new small scale methodologies (CDM-SSC-NM)”, version 5 of 15/09/2007		OK
A.2. Description of the proposed project activity						
A.2.1.	Does the PDD contain an accurate description of the project activity and provide the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation? How was the design of the project assessed?	/1/ /11/ /12/	DR/C C	As per the PDD version 1, the project activity consists of the installation of two new small hydropower plants: Albano Machado (3 MW of installed capacity) and Rio dos Índios (8 MW of installed capacity), located in Rios Grande do Sul state, Brazil. The purpose of the project activity is to provide electricity energy from renewable source as hydropower to the Brazilian National Interconnected System (SIN). At the time of the site visit, Rio dos Índios SHP had not started the equipment's installation and Albano Machado SHP was being implemented (under construction). During site visit at Albano Machado SHP, the following generators and turbines were verified: <u>Turbines (2 units):</u> Enebras Hydro		OK

¹ MoV: DR document review, I interview, CC cross checking

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>Potency: 1,566 KW Serial numbers: 00006375 and 00006376 Generators (2 units) Fabricant: Flessak Eletro Industria Ltda. Marca: General Electric, model A20c Serial number: 79L1-1025, o.s.2146 and o.s. 2147 (serial number not informed in the equipment's plate) Nominal Power 1,800 kVA Effective Power: 1,530 kW Cos ϕ: 0.85 Repowered : 01/2010</p> <p>As the Rio dos Índios SHP was under construction at the time of site visit, Rina could not check the equipments. For this reason, the PP shall provide the evidence of the equipment's description mentioned in the table 1 of the PDD version 1. Moreover, PPs shall confirm if the equipments will be new or repowered ones.</p> <p>PPs are requested to provide an update implementation chronogram for the SHP Rio dos Índios.</p> <p>The reservoir areas for both SHPs were confirmed through the ANEEL Dispatch number 3,761, dated 05/10/2009 for Albano Machado SHP (0.07 Km²) /11/ and ANEEL Dispatch number 3,473 dated 19/08/2009 for Rio dos Índios SHP (0.27 Km²) /12/.</p> <p>The installed capacity for Albano Machado (3 MW) and Rio dos Índios (8 MW) is authorized by ANEEL Authorization Resolution number 764, dated 12/12/2006 and ANEEL Authorization Resolution number 1826, dated 03/03/2009,</p>	<p>CL-1</p> <p>CL-2</p> <p>CAR-1</p>	

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>respectively. However, the mentioned installed capacities are not in accordance with the equipments description verified on site for Albano Machado (equipment's plate= 3,060 KW→ 2*(1,800*0.85)) and the description of equipments in the PDD for Rio dos Índios (=8,010 KW → 2*(4,500*0.89)). The methodology ACM0002, mentioned in the AMS-ID methodology, defines Installed power generation capacity (or installed capacity or nameplate capacity): the installed power generation capacity of a power unit is the capacity, expressed in Watts or one of its multiples, for which the power unit has been designed to operate at nominal conditions. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units. Moreover, ANEEL Resolution number 407, dated 19/10/2000 defines the installed capacity as: “The nominal active electric power of a generating unit (in kW) is defined by the product of the apparent nominal electric power (in kVA) at rated power factor of the electric generator, considering a continuous operation of the system and nominal operating conditions”. The installed capacity shall be provided as per the definitions above.</p>		
<p>A.2.2. Does the project activity involve alteration of existing installations? If yes, have the differences between pre-project and post-project activity been clearly described in the PDD?</p>	/1/	DR	Confirmed during site visit that the project activity is a Greenfield project.		OK
<p>A.2.3. Does the project qualify as a small-scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?</p>	/1/ /2/	DR	<p>The sector scope is I-Energy Industries (renewable/non –renewable sources). According to the list of the small-scale CDM project activity categories contained in Appendix B of the Simplified M&P for the Small-Scale CDM Project Activities, the project activity corresponds to:</p>		OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				Type I: Renewable Energy Projects Category: AMS-I.D "Grid connected renewable electricity generation" version 17 of 03/06/2011 /2/. The project activity has a maximum output capacity less than 15 MW.		
A.2.4.	Is the small-scale project activity a de-bundled component of a larger project activity?	/1/	DR	The project is not a debundled component of a large project activity as there is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity with the same project participants in the same project category and technology/measure within the previous two years and whose project boundary is within 1 km of the project boundary of the proposed small-scale project activity at the closest point.		OK
A.3. Project participants						
A.3.1.	Have the Parties and project participants involved in the project been listed in tabular form in Section A.3 and are they consistent with the information detailed in Annex 1 of the PDD?	/1/	DR CC	The contact information is properly provided using the proper table (tabular format). The project participants are three private entities: Carbotrader Assessoria e Consultoria em Energia Ltda., Rio do Lobo Energia Ltda and Casa de Pedra Energia S.A. Confirmed in the ANEEL website (Albano Machado: http://www.aneel.gov.br/paracemp/apl/PARACEMP_Relatorios/Paracemp_ParticipacaoAccionariaUsinas.asp?PsqUsi1=29514&PsqUsi2 ; and Rio dos Índios: http://www.aneel.gov.br/paracemp/apl/PARACEMP_Relatorios/Paracemp_ParticipacaoAccionariaUsinas.asp?PsqUsi1=30057&PsqUsi2) that Electra Power Geração de Energia S/A is the major shareholder of the SPEs with participation of 70%. PDD version 1 mentions that Electra Power Geração de Energia Ltda is the major shareholder	CL-3	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			of the SPEs. Clarify the name of the major shareholder of the SPEs.		
A.3.2. Do all participating Parties fulfill the participation requirements as follows: (a) Party has ratified the Kyoto Protocol; (b) Party has a Designated National Authority; (c) The assigned amount has been determined.	/1/	DR	Brazil has ratified the protocol on 23 August 2002. Brazil is listed as a non Annex 1 Party. The Brazilian DNA is represented by Interministerial Commission on Global Climate Change- CIMGC ("Comissão Interministerial de Mudança Global do Clima").		OK
A.3.3. Have the letters of approval been issued?	/1/	-	Prior to the submission of the Request for Registration 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.	--	
A.3.4. Do the letter/s of approval (LoA/s) confirm the following requirements? (a) The Party has ratified the Kyoto Protocol; (b) The participation is voluntary; (c) In the case of the host Party, the project contributes to the sustainable development of the country; (d) It refers to the precise project activity title in the PDD; (e) Has been issued by the respective Party's designated national authority (DNA). Indicate whether the LoA/s were received from the project participants or directly from the DNA. In case of doubt regarding the authenticity of the LoA/s, describe how it was assessed the authenticity of the LoA/s.	/1/	-	Please refer to section A.3.3.	--	
A.3.5. Have all private/public project participants been authorized by a Party to the Kyoto Protocol?	/1/	-	Please refer to section A.3.3.	--	
A.4. Technical description of the project					
A.4.1. Is the project location clearly defined?	/1/ /13/ /14/	DR	Yes. Project activity is located in Rio Grande do Sul state, Brazil, in the following cities and Geographical Coordinates:		OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				<p><u>SHP Albano Machado</u>: Trindade do Sul and Nonoai cities, 27° 29'48" S and 52° 48'13" W, confirmed through the ANEEL Resolution Authorization number 764, dated 12/12/2006 /13/.</p> <p><u>SHP Rio dos Índios</u>: Nonoai city, 27°16'30"S and 50°47'38"W, confirmed through the ANEEL Resolution Authorization number 1,826, dated 03/03/2009 /14/.</p>		
A.4.2.	Does the project design engineering reflect current good practices? Would the technology result in a significantly better performance than any commonly used technologies in the host Country? Is any transfer of technology from any Annex I Party involved?	/1/	DR	The project design engineering reflects current good practices in Brazil. The technology and equipments utilized in the project activity is developed and manufactured in Brazil, therefore, transfer of know-how or technology to host country is not established. Equipments are described in the section A.2.1.		OK
A.4.3.	If public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/	DR	No public funding is provided for the “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)”. Both project participants are private entities from Brazil (there is no Annex I Party involved in the project activity)		OK
B. Application of a baseline and monitoring methodology						
B.1. Methodology applied						
B.1.1.	Does the project activity apply an approved methodology and the correct version?	/1/ /2/	DR	<p>The proposed project activity falls under Project category D - Grid connected renewable electricity generation, Type I – Renewable energy projects and Sectoral Scope 1- Energy industries (renewable/non-renewable sources) and qualifies as a small scale CDM project activity as the total installed capacity is less than 15 MW.</p> <p>The PDD version 1 is applying the methodology AMS-I.D, version 15 of 16/10/2009, that is in line with the relevant project category.</p> <p>The project applies the methodology AMS-I.D “Grid connected renewable electricity generation”,</p>	CL-4	OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				<p>Version 15 of 16/10/2009, scope 1 that is in line with the relevant project category. However, considering the grace period (10/02/2011) for the submission of project activities for registration, when using a revised approved methodology, and the present validation timeline to submit projects for registration, it is recommended to revise the PDD according to AMS-I.D version 16, valid from 11 June 2010 onwards.</p> <p>This methodology category (version 15) is applicable as the project is a renewable energy generation plant that will supply electricity to and/or displace electricity from an electricity distribution system, the Brazilian National Interconnected System (SIN), that is or would have been supplied by at least one fossil fuel fired generating unit.</p>		
B.2. Applicability criteria of the methodology/tools						
B.2.1.	The project activity complies with the applicability criteria?	/1/ /2/	DR/C C	<p>The project activity consists on two new small hydropower plants that supply electricity to an electricity system.</p> <p>As the project activity consists in a hydropower plant with reservoir, the item 2 of the methodology AMS-ID, shall be discussed in the PDD: <i>"Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</i> <ul style="list-style-type: none"> <i>• The project activity is implemented in an existing reservoir with no change in the volume of reservoir;</i> <i>• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²;</i> </p>	CAR-2	OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				<p>• The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².”</p> <p>The PDD version 1 mentions in the beginning of section B.4: “The methodology approved for small-scale AMS - ID - “Grid connected renewable electricity generation”, applies the increases in electricity capacity of small hydro power plants, which is the proposed project activity.” However, as per the project’s description, confirmed during the site visit, the project activity consists on the installation of new small hydro power plants. PDD shall be revised accordingly.</p>	CAR-3	
B.2.2.	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/ /2/	DR/C C	Yes. The baseline scenario in the PDD version 1 is defined as per the methodology AMS-I.D, version 15 of 16/10/2009: the kWh produced by the renewable generating unit multiplied by an emission coefficient (in kg CO ₂ e/kWh) calculated in a transparent and conservative manner according to the “Tool to calculate the emission factor for an electricity system – version 02”.		OK
B.3. Project boundary						
B.3.1.	Is the project boundary clearly defined and in accordance with the applied methodology?	/1/ /2/	DR/C C	As per the methodology AMS-I.D, version 15 of 16/10/2009, the physical, geographical site of the renewable generation source delineates the project boundary. Therefore, the project boundary corresponds to the area where the project is located which includes the reservoirs, dams, powerhouses including the turbines, generators, substations and metering systems. Both SHPs will be connected to the National Interconnected grid.		OK
B.3.2.	What are the project’s system boundaries (components and facilities used to mitigate GHGs)?	/1/ /2/	DR/C C	See section B.3.1.		OK
B.3.3.	Which sources are identified for the project?	/1/	DR	As per the methodology, project emissions are		

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
	Does the identified project boundary cover all possible sources linked to the project activity?	/2/		zero, as power density is greater than 10 W/m ² . PDD version 1 mentions “In accordance to guidelines and rules for small-scale project activities, the emissions related to production, transport and distribution of fuel used in baseline electric units are not included in project boundary, since they do not occur at the physical and geographical locality of project”. PP shall specify what <i>guidelines and rules for small-scale project activities</i> PDD refers to.	CL-5	
B.3.4.	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute by more than 1% to the estimated emission reductions of the project?	/1/	DR	Not applicable, during the site visit and document review, it was not identified any other emission source not foreseen by the methodology.		OK
B.4. Baseline scenario identification						
B.4.1.	Which baseline scenarios have been identified? Is the list of the baseline scenarios complete?	/1/ /2/	DR	According to the approved methodology AMS-I.D, version 17 of 03/06/2011, the baseline is define by itself, so no other baseline scenarios have been identified.		OK
B.4.2.	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	Please refer to section B.4.1.		OK
B.4.3.	What is the baseline scenario? Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/ /2/	DR	As per the methodology AMS-I.D, version 15 of 16/10/2009 the baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor. As reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”, emission reductions were estimated <i>ex-ante</i> using the emission factor of the Brazilian grid system for 2008 available at the time of the start of the validation (= 0.3112 tCO ₂ /MWh - average OM=0.4766 tCO ₂ /MWh and BM=0.1458		OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			tCO ₂ /MWh) provided by the Brazilian DNA, and considering all four regions connected (North, Northeast, South and Southeast-Midwest).		
B.4.4. Has the baseline scenario been determined using conservative assumptions? Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /11/ /12/ /13/ /14/ /16/ /17/ /18/ /19/ /20/ /21/	DR/C C	The baseline scenario has been established on a project-specific basis. The project activity is in accordance with the national policies and circumstances. Environmental Requirements: The licenses issued by the environmental agency (FEPAM) are described in the section D.1.1 Energy Requirements: Albano Machado: *ANEEL Dispatch number 3,761, dated 05/10/2009 /11/ *ANEEL Authorization Resolution number 764, dated 12/12/2006 /13/ Rio dos Índios: *ANEEL Dispatch number 3,473 dated 19/08/2009 for Rio dos Índios SHP /12/ * ANEEL Authorization Resolution number 1,826, dated 03/03/2009 /14/.		OK
B.5. Additionality determination					
B.5.1. What tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /7/	DR	Project participants provided the additionality assessment according to the “ <i>Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities</i> ”.		OK
B.5.2. What is the project additionality mainly based on?	/1/	DR	The additionality of the project activity presented in the PDD version 1 is based on the barrier analysis: a) investment barrier and c) barrier due to prevailing practice.		OK
B.5.3. Prior consideration of CDM					
B.5.3.1. What is the starting date of the proposed project activity?	/1/	DR	The project's starting date was defined as 18/09/2009 in the published PDD. PP shall include in the PDD a timeline for the project implementation (for both SHPs), with the	CAR-4	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			evidences, to assure that the project start date was correctly defined as per Glossary of CDM terms, version 5.		
B.5.3.2. What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ /5/ /29/	DR/ CC	The prior consideration of the CDM is available on the UNFCCC website. Notification was done on 19/12/2008 for both SHPs. At the time of the EB notification, the Guidance on the demonstration and assessment of prior consideration of the CDM, version 1 (EB 41, annex 46) was valid. Brazilian DNA was notified on 21/09/2009. (email from Mr. Arthur Moraes to CIMGC-MCT, dated 21/09/2009, CIMGC-MCT response have the same date) /29/.		OK
B.5.3.3. What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/	DR	Please refer to section B.5.3.2.		OK
B.5.3.4. Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/	DR	Not applicable.		OK
B.5.4. Investment analysis					
B.5.4.1. What is the analysis method used to determine whether the proposed project activity is not (a) the most economically or financially attractive; or (b) economically or financially feasible, without the revenue from the sale of certified emission reductions?	/1/	DR	The project participants have chosen the benchmark analysis to demonstrate the project additionality. The benchmark analysis is based on Guidelines on the assessment of the investment analysis (version 3). PP shall justify in the PDD why the option “benchmark analysis” was chosen among the others options of the investment analysis (simple cost analysis, investment comparison analysis or benchmark analysis).	CAR-14	OK
B.5.4.2. What financial indicator is used?	/1/ /30/	DR/C C	The project IRR (internal rate of return) was compared with the yield on Government Bonds plus a Market Risk Premium. Project participants have chosen a Brazilian		OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>Government Bond named National Treasury Notes, Series C (NTN-C). It is placed on the market by the Brazilian National Treasury by a Public Offering and its profitability is linked to Inflation by the IGP-M Index. The Market Risk Premium chosen for the benchmark was based on the study “Uma Análise de Risco do Segmento de Energia Elétrica” – A risk analysis of the Electricity segment, which was presented in the Seminars in Administration in the School of Economics, Business and Accounting at University of São Paulo (USP).</p> <p>The total value of the benchmark presented by project participants in the PDD version 1 is 18.61%, presented in the spreadsheet “Government bond rates.xls”.</p> <p>Regarding the benchmark, the project participants are working with NTN-C with maturity for January 1st, 2031 as per spreadsheet, “Government bond rates.xls”. The web link provided in the PDD does not have the information presented in the spreadsheet, because values are update frequently. As per spreadsheet, “Government bond rates.xls” it was considered as the yield of paper the value quotation in one day for one year (01/08/2009)= 6.40%/year. Project participants added to the paper day quotation the average IGP-M (inflation index) between 1999 and 2008. This represents a misalignment of information, with sums of values that does not represents the same period of time. In addition, taking into account that Brazil does not have a fully stabilized economy and some inflation, an index like IGP-M (that is linked to the profitability of the NTN-C) had a non-linear behavior in the last ten years and so project participants shall consider</p>	CAR-5	

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>a longer period for the calculation of yield average, considering yearly averages and not quotation for specific days. PPs are requested to revise all calculations accordingly.</p> <p>Regarding to the risk premium, project participants are considering the value of 1.27%, that is the average return of investment on the Electrical Segment Index versus IBOVESPA index (mainly index of BOVESPA – São Paulo Stock Exchange). It is not appropriate to use this Risk Premium because it was calculated in a different base, since the project participants are considering the NTN-C as the benchmark and not the IBOVESPA index.</p>	CAR-6	
<p>B.5.4.3. Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the Host Country?</p>	/1/ /9/ /10/	DR	<p>Project participants didn't include the depreciation in the financial calculations spreadsheet ("IRR_AM.xls"/9/ and "IRR_RDI.xls"/10/), however there is no impact on Income Tax calculations because project participants have opted for the Presumed Profit Tax System, where the Income Tax and the Social Contribution are calculated over the Gross Sales and not over the Profit.</p>		OK
<p>B.5.4.4. Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is the working capital returned in the last year of the operation?</p>	/1/ /9/ /10/	DR	<p>For both SHPs (Albano Machado and Rio dos Índios), Project participants have considered a period of 32 years in the financial analysis, the two first years (2009/2010) for the investments, the second year (2010) with partial capacity and another 30 years for the operation.</p> <p>A salvage value of 40% of the total investment was applied in the last year of the financial analysis.</p> <p>Project participants shall clarify the calculations to obtain the residual value (salvage value) applied in the last year of the financial analysis.</p>	CL-6	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			In the spreadsheets version 1 ("IRR_AM.xls"/9/ and "IRR_RI.xls" /10/) no working capital was taken into account, and there is not its returning in the last year of the operation. PP shall explain why the working capital value was not considered in the financial analysis.	CL-7	
B.5.4.5. Cross-check of main parameters used in the financial analysis: electricity generation, electricity tariff, investment costs, operating and maintenance costs, taxes, other costs. The main parameters can be changed for the different project categories.	/1/ /9/ /10/ /22/ /23/ /24/ /25/ /26/ /27/ /31/ /32/	DR	<p>Project participants provided the spreadsheets "IRR_AM.xls" /9/ and "IRR_RI.xls" /10/ with all financial analysis for the SHP Albano Machado and SHP Rio dos Índios separately. All spreadsheets are written in English language.</p> <p>The spreadsheets "IRR_AM.xls" /9/ and "IRR_RI.xls" /10/ contain financial indicators not used in the financial analysis (section 9 of the spreadsheets). PP shall exclude this section of the spreadsheets.</p> <p>The Albano Machado SHP is a R\$ 14.07 millions of investment and the Rio dos Índios SHP is a R\$36.745 millions of investment, for both projects the investment is divided in 2 years, 20% in the year 2009 and 80% in the year 2010 (that is the first year of operation). The investment cost comes from the Eletrobrás Standard Budget (<i>Orçamento Padrão Eletrobrás-OPE</i>). For the Albano Machado SHP, the whole detail of the investment of 14,070,472.78 is presented the spreadsheet "OPE PCH ALBANO MACHADO 10 12 08_R01-RISCHBIETER.xls reference date 09/02/2009 /23/ and same value is presented in the document provided by PP with the consolidate investment costs ("OPE_AM.pdf"/24/). For the Rio dos Índios SHP, the detail of the investment of R\$ 36,745,269.82 is presented in the spreadsheet "OPE_PCH RIO DOS ÍNDIOS 15</p>	CL-8	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>04 09.xls”/25/, however, the document provided by PP with the consolidate investment costs (“OPE_RDI.pdf” /26/) has the reference date of 10/09/2007 and presents the value of R\$ 25,208,289.33.</p> <p>PP shall provide the evidences that the OPEs presented to the DOE are the same sent to ANEEL and clarify the difference between the documents presented for the Rio dos Índios SHP: “OPE_PCH RIO DOS ÍNDIOS 15 04 09.xls”/25/ and “OPE_RDI.pdf” /26/ .</p> <p>For the Albano Machado SHP, the amount of energy presented in the IRR spreadsheet (“IRR_AM.xls”)/9/, 14.541 MW/year, is based on the net power (assured energy= 1.66 MW average) that is approved by the ANEEL Decree number 079/2007, dated 08/05/2007) /32/. For the Rio dos Índios SHP, the amount of energy presented in the IRR spreadsheet (“IRR_RDI.xls”) /10/, 37.983 MW/year, is based on the net power (assured energy= 4.336 MW average).</p> <p>PP shall clarify the assured energy of the Rio dos Índios SHP used in the IRR spreadsheet (“IRR_RDI.xls”) and CERs spreadsheet (“JUN1115_CERs_v1.xls”). The letter provided by PP, RDI-CA-001-R0, dated 24/04/2009 asks to ANEEL to homologate the assured energy of 4.39 MW average /27/, while the spreadsheets presents the assured energy of 4.336 MW average.</p> <p>Regarding the energy prices, for both projects, 100% of electricity generated will be traded by a stabled price at R\$ 155.0 / MWh. This price was based on market forecasts (according to the e-</p>	<p>CL-9</p> <p>CAR-7</p> <p>CL-10</p>	

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>mail document “Fwd Cotação de energia.msg”, dated 24/03/2009) /31/.</p> <p>Further information about the energy prices and its evolution shall be presented. It should be clear what is the reference date for this prices, how the value was estimated and which index will be chosen to adjust this prices over the years (For example: ...the price was defined for July/200X as R\$ Y MW/h and should be adjusted every year by the Z index). The evidences shall be presented.</p> <p>For the Albano Machado SHP, the costs of operation, administrative and maintenance are estimated respectively in R\$ 16,500.00, R\$ 8,000.00 and R\$ 3,500.00 per month, summing a total of R\$ 336,000.00 per year. For the Rio dos Índios SHP, the costs of operation, administrative and maintenance are estimated respectively in R\$ 19,500.00, R\$ 11,500.00 and R\$ 6,000.00 per month, summing a total of R\$ 444,000.00 per year. Estimative was detailed in the spreadsheet “Custos de OEM - ALM e RDI.xls” /22/</p> <p>Both projects are framed on the Presumed Profit Tax System, all taxes are being correctly applied in accordance with the local legislation. In Presumed Profit Tax System, all taxes (including the Income Tax and the Social Contribution Tax) are applied over the Gross Revenue.</p> <p>Regarding to prices and costs evolution over the years, PPs have presented flat values for all years. It is necessary to demonstrate in the P&L and Cash Flow the evolution for all lines, in accordance to the more appropriate inflation index. This evolution can be different for any line</p>	CAR-8	

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			and this can represent a significant impact on the EBITDA evolution. The inflation on prices and costs has to be considered because in the benchmark the return of the investment includes the inflation. Also related to the indexes, inflation and interest rates and also foreign exchange rates, PPs should demonstrate the sources of the information. Furthermore, PPs shall prioritize the sources of the Brazilian Government or some large financial institutions (normally those institutions provide a forecast for next few years). After this, the PPs should repeat the last year forecasted for all the project period and the financial spreadsheet and PDD shall be revised accordingly.		
B.5.4.6. Sensitivity analysis: have the key parameters contributing more than 20% of the revenue/costs during operating or implementation been identified?	/1/ /9/ /10/	DR	<p>The following parameters were taken into account in the combined sensitivity analysis: (i) Investment Value, (ii) Plant Load Factor and (iii) Energy Price. The magnitude of IRR variations will depend on the extent to which these parameters vary. Positive variations of Energy Price and Plant Load Factor are beneficial to the projects' IRR while the opposite holds true for Investments.</p> <p>The sensitivity analysis did not include the Operational Cost and, according to the “Guidelines o the assessment of investment analysis” (Version 03 – EB 51 annex 58) Article 17, “Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation”. However, project participants should apply a sensitivity analysis in this parameter as this is the main cash out value over the years after the investment.</p> <p>The sensitivity analysis presented in the PDD</p>	CAR-9	OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				version 1 has a misalignment of information with the spreadsheets. The breakeven value for Plant Load Factor is changed between SHPs. PPs shall correct this information.	CAR-10	
B.5.4.7.	Sensitivity analysis: the range of variations is reasonable in the project activity? The main parameters can be changed for the different project categories.	/1/ /9/ /10/	DR	The sensitivity analysis, with the parameters chosen and the range of variations are reasonable and applicable to the project activity.		OK
B.5.4.8.	Have the key parameters been varied to reach the benchmark and the likelihood of this happening been justified?	/1/ /9/ /10/	DR	Project participants prepared a Sensitivity Analysis with the break even point between the project's IRR and the established benchmark, for all parameters it was necessary a high value of deviation to achieve the breakeven point. Yet a Likelihood Analysis was prepared describing that is not reasonable achieve this deviation in the considered parameters.		OK
B.5.5.	Barrier analysis					
B.5.5.1.	Are the barriers identified complementary to a potential investment analysis?	/1/	DR	Yes. The investment barrier presented the investment analysis described in the section B.5.4.		OK
B.5.5.2.	How were the investment barriers assessed to be real? How does CDM alleviate the investment barriers?	/1/	DR	See section B.5.4.		OK
B.5.5.3.	Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	See section B.5.4		OK
B.5.5.4.	How were the technological barriers assessed to be real? How does CDM alleviate the technological barriers?	/1/	DR	Not applicable.		OK
B.5.5.5.	Is the project activity prevented by the technological barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.5.6.	How were the barriers due to prevailing practice	/1/	DR	Regarding the barrier due to prevailing practice,	CAR-11	

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
assessed to be real? How does CDM alleviate the barriers due to prevailing practice?			PDD version 1 discussed the history of the Brazilian Electric sector and national scenario of the Brazilian electrical system. However, without the common practice analysis it can not be verified if the prevailing practice is a barrier. PP are requested to include the common practice analysis in order to make possible to confirm the barrier due to prevailing practice.		
B.5.5.7. Is the project activity prevented by the barriers due to prevailing practice and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	See section B.5.5.6.		OK
B.5.5.8. How were the other barriers assessed to be real? How does CDM alleviate the other barriers?	/1/	DR	Not applicable.		OK
B.5.5.9. Is the project activity prevented by the other barriers and is at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.6. Common practice analysis					
B.5.6.1. What are the geographical scope and scope of technology of the common practice analysis?	/1/	DR	Not applicable.		OK
B.5.6.2. How many similar non-CDM-projects exist in the region within the project's scope?	/1/	DR	Not applicable.		OK
B.5.6.3. How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	Not applicable.		OK
B.5.6.4. What is the data source(s) used for the common practice analysis?	/1/	DR	Not applicable.		OK
B.5.7. Conclusion on the additionality assessment					
B.5.7.1. What is the conclusion with regard to the additionality of the project activity?	/1/	DR	The conclusion will be assessed after the conclusion of the corrective actions. .	CAR 5, CAR 6, CAR 7, CAR 8, CAR 9, CAR 10, CAR 11, CL 6, CL 7, CL 8, CL 9, CL	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				10	
B.6. Calculation of GHG emission reductions					
B.6.1. Baseline emissions					
B.6.1.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /2/	DR	PDD version 1 presents the baseline emissions as per the methodology AMS-I.D, version 15 of 16/10/2009. Baseline emissions are calculated by multiplying the energy delivered to the grid by the emission factor: $BE_y = EF_{grid,CM,y} * EG_{PJ,y}$		OK
B.6.1.2. Have conservative assumptions been used when calculating the baseline emissions and are the uncertainty estimates properly addressed?	/1/ /2/	DR	Baseline emissions are estimated in a conservative manner. Data for the emission factor is public available by Brazilian DNA and assured energy (considering the plant load factor) is provided by ANEEL for both SHPs . Emission reductions were estimated <i>ex-ante</i> using the latest available emission factor available at the start of the validation of the Brazilian grid system for 2008 (= 0.3112 tCO ₂ /MWh - average OM=0.4766 tCO ₂ /MWh and BM=0.1458 tCO ₂ /MWh) provided by the Brazilian DNA, and considering all four regions connected (North, Northeast, South and Southeast-Midwest).		OK
B.6.2. Project emissions					
B.6.2.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /2/	DR	Project emissions are not applicable to the project activity. Power density is greater than 10 W/m ² .		OK
B.6.2.2. Have conservative assumptions been used when calculating the project emissions and are the uncertainty estimates properly addressed?	/1/ /2/	DR	Power density was calculated as per the methodology ACM0002, as required by the methodology AMS-ID.		OK
B.6.3. Leakage					
B.6.3.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /2/	DR/C C	As per the methodology AMS-I.D, “If the energy generating equipment is transferred from another activity, leakage is to be considered.” Verified during site visit in the generator’s plates of the Albano Machado SHP that the equipments were	CAR-12	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			repowered. PPs are requested to provide the evidences of where the equipments were installed and where the energy generated was being used before the project activity. Moreover, as the equipments for the Rio dos Índios SHP were not installed during site visit, PPs shall confirm if the equipments will be new or repowered ones (see CL 1) and in the case of repowering, the same evidences requested to Albano Machado SHP shall be provided for Rio dos Índios.		
B.6.3.2. Have conservative assumptions been used when calculating the leakage and are the uncertainty estimates properly addressed?	/1/ /2/	DR	See section B.6.3.1	CAR-12	OK
B.6.4. Emission reductions					
B.6.4.1. Has the methodology been correctly applied to calculate the emission reductions and can this be replicated by the data provided in the PDD and supporting files to be submitted for registration?	/1/ /2/	DR	Yes, the methodology was correctly applied.		OK
B.6.5. Data and parameters that are available at validation and that are not monitored					
B.6.5.1. How were the parameters available at validation verified?	/1/ /2/	DR	There are no parameters available at validation. The parameters will be monitored.		OK
B.7. Monitoring plan					
B.7.1. Data and parameters monitored					
B.7.1.1. Does the monitoring plan described in the PDD comply with the requirements of the methodology?	/1/	DR	Yes, the monitoring plan is in accordance with the applied methodology.		OK
B.7.1.2. Does the monitoring plan contain all necessary parameters and are they clearly described?	/1/	DR	The following parameters are mentioned as to be monitored: $^{*}EG_{Albano\ Machado,y}$ - Net Electricity supplied by the SHP Albano Machado to the grid in hour h ; $^{*}EG_{Rio\ dos\ Índios,y}$ - Net Electricity supplied by the SHP Rio dos Índios to the grid in hour h ; $^{*}EF_{grid,CM,y}$ - Brazilian grid emission factor; $^{*}EF_{grid,OM-DD,y}$ - CO ₂ Operating Margin emission factor of the grid, in a year y ; $^{*}EF_{grid,BM,y}$ - CO ₂ Build Margin emission		OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
			<p>factor of the grid, in a year y; Measurement methods and procedures are specified.</p> <p>Ex-post calculation of emission reductions The combined margin emission factor ($EF_{grid,CM,y}$) will be calculated <i>ex-post</i> using the CO₂ emission factors for the build margin and the operational margin that are provided by the Brazilian DNA. CO₂ emission factors for the build margin and the operational margin for electricity generation in Brazil's National Interconnected System (SIN) are calculated, according to the dispatch analysis, from generation records of plants dispatched in a centralized manner by the National Electric System Operator (ONS).</p>		
B.7.1.3. Is the measurement equipment described? Is the accuracy of the measurement equipment addressed and deemed appropriate? Are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?	/1/	DR	<p>The energy delivered to the grid will be measured through electricity meters that comply with national standards. The National Grid Operator (ONS) and Electric Power Commercialization Chamber (CCEE) are responsible for the definition of the technical requirements of energy measurements for billing.</p> <p>The emission factor will be calculated using data provided by Brazilian DNA.</p>		OK
B.7.1.4. Is the monitoring frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/1/	DR	The net energy delivered to the grid will be measured hourly and recorded monthly as per the requirements of the methodology.		OK
B.7.1.5. Is the recording frequency adequate for all monitoring parameters? Is it in line with the monitoring methodology?	/1/	DR	See section B.7.1.4.		OK
B.7.2. Monitoring of sustainable development indicators/ environmental impacts					
B.7.2.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	Not applicable.	-	OK
B.7.2.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning	/1/	DR	Not applicable.	-	OK

Checklist Question	Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
environmental, social and economic impacts?					
B.7.2.3. Are the sustainable development indicators in line with stated national priorities in the host country?	/1/	DR	Not applicable.	-	OK
B.7.3. Management, quality assurance and quality control					
B.7.3.1. How it has been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	Yes, the monitoring of the project activity will follow the national standards.		OK
B.7.3.2. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	At the time of site visit, the project was being implemented and procedures were not available. In the first verification it shall be checked training courses provided to the operational team and if data archiving and data collection procedures are properly described and implemented.	FAR 1	
B.7.3.3. Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported <i>ex post</i> and verified?	/1/	DR	The indicated QA/QC procedures are in line with the applied methodology. The electricity supplied to the grid will be monitored by electronic calibrated and inviolable (sealed) energy meters. The data from the energy meters will be cross checked with the invoices of energy sales or with the CCEE databank.		OK
B.7.3.4. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, whichever occurs later?	/1/	DR	PPs shall revise the PDD according to the “Guidelines for completing the simplified project design document (CDM-SSC-PDD)” (<i>data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later</i>).	CAR-13	OK
C. Duration of the project activity and crediting period					
C.1. Start date of project activity					
C.1.1. What is the expected project's starting date of the project activity and how it has been determined? When was the first construction activity?	/1/	DR	The starting date presented in the PDD version 1 is 18/09/2009 and represents the start construction of the SHP Albano Machado. PP shall include in the PDD a timeline for the	CAR-4	OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
				project implementation (for both SHPs), with the evidences, to assure that the project start date was correctly defined as per Glossary of CDM terms, version 5.		
C.1.2.	What is the expected operational lifetime of the project activity? Is it deemed reasonable?	/1/ /28/	DR	The expected operational lifetime of the project was defined in the published PDD as 30 years (0 months), and deemed reasonable. The same period for which the ANEEL Authorization Resolution number 764, dated 12/12/2006 and ANEEL Authorization Resolution number 1826, dated 03/03/2009 are valid. Moreover, the operational lifetime was defined as per the ANEEL guidelines “ <i>Estudo de Vida Útil Econômica e Taxa de Depreciação</i> ”, dated November 2000 /28/. PP shall confirm the expected operational lifetime of the equipments according to the equipments’ specification.	CL-12	OK
C.2. Start date of crediting period						
C.2.1.	What is the expected crediting period starting date of the proposed project activity?	/1/	DR	According to the published PDD, the expected crediting period starting date of the proposed project activity is 01/01/2011.		OK
C.2.2.	What is the length of the crediting period? Is it clearly defined and deemed reasonable?	/1/	DR	According to the published PDD, a renewable crediting period of 7 years has been chosen, starting from 01/01/2011, or the date of registration, whichever is later. According to the published PDD, the total GHG emission reductions from the “SHPs Albano Machado and Rio dos Índios CDM Project (JUN1115)” are estimated to be 114,420 tCO ₂ e during the first renewable 7 years crediting period, resulting in an annual average emission reductions of 16,346 tCO ₂ e / year.		OK
D. Environmental Impact						
D.1.1.	Has an analysis of the environment impacts of the project activity been undertaken? Is it clearly and sufficiently described in the PDD?	/1/ /16/ /17/	DR/C C	The environmental aspects of the project activity were analyzed by the environmental agency (FEPAM- Fundação Estadual de Proteção		OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion
		/18/ /19/ /20/ /21/		<p>Ambiental- Environmental Protection State Foundation)</p> <p>The project obtained the following environmental license, assessed by RINA:</p> <p>SHP Albano Machado:</p> <ul style="list-style-type: none"> -Preliminary License: LP number 703/2004-DL – issued by FEPAM, dated 03/09/2004 /16/ - Installation License: LI number 878 /2009-DL – issued by FEPAM, dated 10/08/2009./17/ -Updated installation License: LI number 03/2010-DL- issued by FEPAM, dated 04/01/2010./18/ <p>SHP Rio dos Índios:</p> <ul style="list-style-type: none"> -Preliminary License: LP number 307/2004-DL – issued by FEPAM, dated 23/04/2004./19/ -Installation License: LI number 375/2008-DL – issued by FEPAM, dated 22/04/2008./20/ -Updated installation License: LI number 275/2010-DL - issued by FEPAM, dated 17/03/2010 (substitute the previous Installation License) /21/ <p>PPs are requested to include in the PDD the updated Installation Licenses for the Albano Machado and Rio dos Índios SHPs.</p>	GL-11	
D.1.2.	Will the project create any adverse environmental effects? Are transboundary environmental impacts considered in the analysis?	/1/	DR	See section D.1.1.		OK
D.1.3.	Is the analysis of the environmental impacts required by the legislation of the host Country? If yes, has the EIA has been approved by local Government? Does the approval contain any conditions that need monitoring?	/1/	DR	See section D.1.1.		OK
D.1.4.	Is it the project in line with the current environmental	/1/	DR	See section D.1.1.		OK

Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion																								
legislation in the host Country?																														
E. Local stakeholder consultation																														
E.1.1.	Were the local stakeholders invited by the PP prior to the publication of the PDD in the UNFCCC website?	/1/	DR	As per Brazilian Resolution number 7, the invitations to the local stakeholder consultation shall be sent 15 days in advance of the validation process. Except for the Brazilian Forum of NGOs and Social Movements for Environment and Development (FBOMS), that the consultation was performed on January/2010, all stakeholders were invited to comment on the project on December/2009.		OK																								
E.1.2.	Have relevant stakeholders been adequately consulted / invited for comments (addresses provided / available)?	/1/ /33/	DR	It was verified that the local stakeholders consultation followed the Brazilian DNA Resolution nº 7 requirements and letters were sent to the following stakeholders /33/: <table><tr><th>Stakeholders</th><th>ARs</th></tr><tr><td>City Hall of Nonoai</td><td>09/12/2009</td></tr><tr><td>Hall of Councilors of Nonoai</td><td>10/12/2009</td></tr><tr><td>Department of Planning, Development, Industry, Commerce and Tourism of Nonoai</td><td>09/12/2009</td></tr><tr><td>Department of Public Works of Nonoai</td><td>09/12/2009</td></tr><tr><td>Municipal Service Center for Children and Teenagers Adílio Daronch - CEMACAAAD</td><td>09/12/2009</td></tr><tr><td>Chamber of Commerce, Cultural, Industrial, Services and Agriculture of Nonoai</td><td>09/12/2009</td></tr><tr><td>City Hall of Trindade do Sul</td><td>11/12/2009</td></tr><tr><td>Hall of Councilors of Trindade do Sul</td><td>09/12/2009</td></tr><tr><td>Department of Agriculture of Trindade do Sul</td><td>11/12/2009</td></tr><tr><td>Cooperative of Agricultural Production in Trindade do Sul</td><td>17/12/2009</td></tr><tr><td>Brazilian Forum of NGOs and Social Movements for Environment and</td><td>21/01/2010</td></tr></table>	Stakeholders	ARs	City Hall of Nonoai	09/12/2009	Hall of Councilors of Nonoai	10/12/2009	Department of Planning, Development, Industry, Commerce and Tourism of Nonoai	09/12/2009	Department of Public Works of Nonoai	09/12/2009	Municipal Service Center for Children and Teenagers Adílio Daronch - CEMACAAAD	09/12/2009	Chamber of Commerce, Cultural, Industrial, Services and Agriculture of Nonoai	09/12/2009	City Hall of Trindade do Sul	11/12/2009	Hall of Councilors of Trindade do Sul	09/12/2009	Department of Agriculture of Trindade do Sul	11/12/2009	Cooperative of Agricultural Production in Trindade do Sul	17/12/2009	Brazilian Forum of NGOs and Social Movements for Environment and	21/01/2010		OK
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Checklist Question		Ref.	MoV 1	Comments	Draft Conclusion	Final Conclusion								
				<table><tr><td>Development (FBOMS)</td><td></td></tr><tr><td>State Foundation of Environmental Protection - FEPAM</td><td>08/12/2009</td></tr><tr><td>Public Ministry of State of Rio Grande do Sul</td><td>09/12/2009</td></tr><tr><td>Prosecutor's Office in the State of Rio Grande do Sul</td><td>09/12/2009</td></tr></table> <input type="checkbox"/>	Development (FBOMS)		State Foundation of Environmental Protection - FEPAM	08/12/2009	Public Ministry of State of Rio Grande do Sul	09/12/2009	Prosecutor's Office in the State of Rio Grande do Sul	09/12/2009		
Development (FBOMS)														
State Foundation of Environmental Protection - FEPAM	08/12/2009													
Public Ministry of State of Rio Grande do Sul	09/12/2009													
Prosecutor's Office in the State of Rio Grande do Sul	09/12/2009													
E.1.3.	Is the summary of the comments received from the stakeholders provided in the PDD (provided / available)?	/1/	DR	No comments were received.		OK								
E.1.4.	Has due account been taken by the project participants of any stakeholder comments received?	/1/	DR	No comments were received.		OK								
E.1.5.	If a stakeholder consultation process is required by regulations/laws in the host Country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /33/	DR	It was verified that the local stakeholders consultation followed the Brazilian DNA Resolution nº 7 requirements. Letters were sent in Portuguese and PDD was made publicly available, in Portuguese, in the following web link: www.carbotrader.com/jun1115dcp.pdf		OK								

TABLE 3 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation Conclusion
CAR-1 The installed capacity for Albano Machado (3 MW) and Rio dos Índios (8 MW) is authorized by ANEEL Authorization Resolution number 764, dated 12/12/2006 and ANEEL Authorization Resolution number 1826, dated 03/03/2009, respectively. However, the mentioned installed capacities are not in accordance with the equipments description verified on site for Albano Machado (equipment's plate= 3,060 KW→ 2*(1,800*0.85)) and the description of equipments in the PDD for Rio dos Índios (=8,010 KW → 2*(4,500*0.89)). The methodology ACM0002, mentioned in the AMS-ID methodology, defines Installed power generation capacity (or installed capacity or nameplate capacity): the installed power generation capacity of a power unit is the capacity, expressed in Watts or one of its multiples, for which the power unit has been designed to operate at nominal conditions. The installed power generation capacity of a power plant is the sum of the installed power generation capacities of its power units. Moreover, ANEEL Resolution number 407, dated 19/10/2000 defines the installed capacity as: “The nominal active electric power of a generating unit (in kW) is defined by the product of the apparent nominal electric power (in kVA) at rated power factor of the electric generator, considering a continuous operation of the system and nominal operating conditions”. The installed capacity shall be provided as per the definitions above.	A.2.1	The installed capacity of the SHPs was adjusted accordingly in the PDD version 2.	The installed capacities presented in the PDD version 2 of 05/01/2011 were revised as per the equipments specifications. As per ANEEL Resolution nº 407/2000 the SHP capacity can vary from the planned power capacity and the implemented one in +/- 5% without affect the legal documents already issued (shouldn't be formally declared and justified to the ANEEL for regularization). This CAR is closed.
CAR-2 As the project activity consists in a hydropower	B.2.1	The item 2 of the meth AMS I. D was discussed in the PDD version 2 (section	PDD version 2 was revised accordingly. The project activity will supply electricity

<p>plant with reservoir, the item 2 of the methodology AMS-ID, shall be discussed in the PDD:</p> <p><i>“Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</i></p> <ul style="list-style-type: none"> <i>• The project activity is implemented in an existing reservoir with no change in the volume of reservoir;</i> <i>• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²;</i> <i>• The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m²”.</i> 		<p>B2).</p>	<p>to the Brazilian national grid, the Albano Machado (3.06 MW) and Rio dos Índios (8.01 MW), totalizing 11.07 MW, therefore below 15 MW eligible to this project category;</p> <p>The project SHPs are Greenfield power plants and results in new reservoirs with the Power Density (PD) greater than 4 W/m² (34.26 W/m² for Albano Machado and 31.71 W/m² for Rio dos Índios).</p> <p>Verified that the PDD version 2 presents the reservoir area as per the updated environmental licenses:</p> <p>-Updated installation License: LI number 03/2010- DL- issued by FEPAM, dated 04/01/2010</p> <p>--Updated installation License: LI number 275/2010-DL - issued by FEPAM, dated 17/03/2010 (substitute the previous Installation License</p> <p>This CAR is closed.</p>
<p>CAR-3</p> <p>The PDD version 1 mentions in the beginning of section B.4: “The methodology approved for small-scale AMS-I.D - “Grid connected renewable electricity generation”, applies the increases in electricity capacity of small hydro power plants, which is the proposed project activity.” However, as per the project’s description, confirmed during the site visit, the project activity consists on the installation of new small hydro power plants. PDD shall be revised accordingly.</p>	<p>B.2.1</p>	<p>The section B4 was revised accordingly.</p>	<p>The PDD version 2 was revised accordingly. The project activity is the installation of a new grid-connected renewable power plant/unit.</p> <p>This CAR is closed.</p>
<p>CAR-4</p> <p>PP shall include in the PDD a timeline for the project implementation (for both SHPs), with the evidences, to assure that the project start date was correctly defined as per Glossary of CDM terms, version 5.</p>	<p>B.5.3.1, C.1.1</p>	<p>The project timeline for both projects was included in the PDD version 2 (section B5)</p> <p><u>Second Response:</u></p> <p>The Timeline was adjusted in order to include the Generators and Turbines data</p>	<p>The timeline with equipments purchase was included in the PDD version 2, however, PPs have just included the generators contract for the SHP Albano Machado.</p> <p>PPs are requested to include the main</p>

		<p>acquisition for the SHP Albano Machado. Also, more evidences about others equipments contract was delivered to the DOE responsible.</p> <p>Since the SHP Rio dos Índios didn't start the equipments acquisition the timeline remains the same.</p>	<p>contracts, such as turbines purchase and contract for the construction of the both SHPs in order to evidence that the project starting date defined in the PDD was the earliest date at which either the implementation or construction or real action of a project activity began.</p> <p>This CAR remains open.</p> <p><u>Second Response DOE:</u> The timeline was revised accordingly.</p> <p>This CAR is closed.</p>
<p>CAR-5</p> <p>Regarding the benchmark, the project participants are working with NTN-C with maturity for January 1st, 2031 as per spreadsheet, “Government bond rates.xls”. The web link provided in the PDD does not have the information presented in the spreadsheet, because values are update frequently. As per spreadsheet, “Government bond rates.xls” it was considered as the yield of paper the value quotation in one day for one year (01/08/2009)= 6.40%/year. Project participants added to the paper day quotation the average IGP-M (inflation index) between 1999 and 2008. This represents a misalignment of information, with sums of values that does not represents the same period of time. In addition, taking into account that Brazil does not have a fully stabilized economy and some inflation, an index like IGP-M (that is linked to the profitability of the NTN-C) had a non-linear behavior in the last ten years and so project participants shall consider a longer period for the calculation of yield average, considering yearly averages and not quotation for specific days. PPs are requested to revise all calculations accordingly.</p>	<p>B.5.4.2</p>	<p>Since the benchmark in the PDD version 2 was changed to the Selic rate this CAR is no longer applicable.</p> <p><u>Second Response:</u></p> <p>The PPs agreed to remain the previous Benchmark (NTN-C with maturity in 01/01/2031), but this time considering 5 years average instead quotation for specific days.</p> <p>So the calculation was revised accordingly and in a conservative approach the Risk Premium was considered zero.</p> <p>We understood that the benchmark is public available instead the, example, a company's WACC, based on this the PPs considered not necessary to evidence that the same benchmark was used previously.</p>	<p>Project participants should clarify the reason to change the benchmark in the PDD version 2. Furthermore, project participants must submit evidences that the same benchmark was applied in previous investment decisions and if it was considered the same assumptions (that the benchmark was compared with a Financial Analysis without inflation impact).</p> <p>This CAR remains open.</p> <p><u>Second Response DOE:</u> Project participants are using as benchmark a Brazilian Government Bond (NTN-C with maturity in 01/01/2031). The value of 17.13% is the average of 5 years, all sources ere presented and could be checked.</p> <p>This CAR is closed.</p>

<p>CAR-6</p> <p>Regarding to the risk premium, project participants are considering the value of 1.27%, that is the average return of investment on the Electrical Segment Index versus IBOVESPA index (mainly index of BOVESPA – São Paulo Stock Exchange). It is not appropriate to use this Risk Premium because it was calculated in a different base, since the project participants are considering the NTN-C as the benchmark and not the IBOVESPA index.</p>	<p>B.5.4.2</p>	<p>Since the benchmark in the PDD version 2 was changed to the Selic rate this CAR is no longer applicable.</p> <p><u>Second Response:</u> As described in the CAR 5 second response the benchmark calculations no more consider the Risk Premium.</p>	<p>As described in validation decision of CAR 5. This CAR remains open.</p> <p><u>Second Response DOE:</u> Project participants are no longer using the Risk Premium in the benchmark calculations. This CAR is closed.</p>
<p>CAR-7</p> <p>PP shall clarify the assured energy of the Rio dos Índios SHP used in the IRR spreadsheet ("IRR_RDI.xls") and CERs spreadsheet ("JUN1115_CERs_v1.xls"). The letter provided by PP, RDI-CA-001-R0, dated 24/04/2009 asks ANEEL to homologate the assured energy of 4.39 MW average /27/, while the spreadsheets presents the assured energy of 4.336 MW average.</p>	<p>B.5.4.5</p>	<p>The MWmed is the value defined in the SHP Rio dos Índios Project Design (May 2008). The letter provided is based on "RELATÓRIO TÉCNICO - Homologação da Energia Assegurada" dated on April 2009. The new study was delivered to the ANEEL and can be followed through the Process number: 48500.0022214/2003-22. The PDD and Finance spreadsheet were updated accordingly.</p> <p><u>Second Response:</u> Now the Assured Energy can be checked through the "Rischbieter Engenharia e Serviços" Studies page 10 (Third Party Company) and also through the Project Proponent's Letter to the BRDE (Banco Regional de Desenvolvimento do Extremo Sul).</p>	<p>As described in validation decision of CAR 5. This CAR remains open.</p> <p><u>Second Response DOE:</u> The assured energy of Rio dos Índios Project could be checked in the document "2010 08 02 Casa de Pedra Energia protocolo BRDE.pdf" and in the document "Rischbieter Engenharia e Serviços". Therefore, the PLF for is in accordance with the "Guidelines for the reporting and validation of Plant Load Factors", that is 4.336 MW average.</p> <p>This CAR is closed.</p>
<p>CAR-8</p> <p>Regarding to prices and costs evolution over the years, PPs have presented flat values for all years. It is necessary to demonstrate in the P&L and Cash Flow the evolution for all lines, in accordance to the more appropriate inflation index. This evolution can be different for any line and this can represent a significant impact</p>	<p>B.5.4.5</p>	<p>Since the benchmark was changed to the Selic rate there is not applicable the price and costs evolution over the years.</p> <p><u>Second Response:</u> The IRR Spreadsheets was revised in order to include the inflation effects on the prices and costs.</p>	<p>As described in validation decision of CAR 5. This CAR remains open.</p> <p><u>Second Response DOE:</u> Project participants considered the inflation impact in the cash flow analysis and presented the sources of information.</p>

on the EBITDA evolution. The inflation on prices and costs has to be considered because in the benchmark the return of the investment includes the inflation. Also related to the indexes, inflation and interest rates and also foreign exchange rates, PPs should demonstrate the sources of the information. Furthermore, PPs shall prioritize the sources of the Brazilian Government or some large financial institutions (normally those institutions provide a forecast for next few years). After this, the PPs should repeat the last year forecasted for all the project period and the financial spreadsheet and PDD shall be revised accordingly.		The personnel costs were adjusted according to the IPCA inflation index and the other fees/services according to the IGPM inflation index. In line with the Art. 8 (page 2) from the ANEEL document contained in the link below: www.aneel.gov.br/cedoc/aren2006234_2.pdf	This CAR is closed.
CAR-9 The sensitivity analysis did not include the Operational Cost and, according to the "Guidelines o the assessment of investment analysis" (Version 03 – EB 51 annex 58) Article 17, "Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation". However, project participants should apply a sensitivity analysis in this parameter as this is the main cash out value over the years after the investment.	B.5.4.6	The sensitivity analysis in the PDD version 2 and also spreadsheets included the Operational Costs.	Project participants included in the PDD and in the financial analysis spreadsheet the sensitivity analysis of the operational costs. This CAR is closed.
CAR-10 The sensitivity analysis presented in the PDD version 1 has a misalignment of information with the spreadsheets. The breakeven value for Plant Load Factor is changed between SHPs. PPs shall correct this information.	B.5.4.6	The correction was done in the PDD version 2.	Project participants included in the PDD and in the financial spreadsheets the sensitivity analysis of Operational Costs. This CAR is closed.
CAR-11 Regarding the barrier due to prevailing practice, PDD version 1 discussed the history of the Brazilian Electric sector and national scenario of the Brazilian electrical system. However, without	B.5.5.6	The barrier due to prevailing practice was revised accordingly in the PDD version 2.	The common practice analysis was included in the PDD version 2. PPs have compared others activities that are operational and that are similar to the proposed project activity, including in the analysis SHPs located in Brazil

<p>the common practice analysis it can not be verified if the prevailing practice is a barrier. PP are requested to include the common practice analysis in order to make possible to confirm the barrier due to prevailing practice.</p>			<p>(geographical area), with installed capacity 50% less than SHP Albano Machado power capacity and 50% above the SHP Rio dos Índios power capacity, therefore SHPs with installed capacity between 1.5 to 12.0 MW. PPs have considered SHPs with power density greather than 4 W/m² that became operational from 2005 to 2008 (when PP notified EB about the implementation of the project activity under the CDM- CDM consideration) (projects that have been implemented in a comparative environment on the point of view of regulations).</p> <p>Based on that analysis, it was found out the following similar projects in 2005 – 2008:</p> <ul style="list-style-type: none"> -N° of SHPs with capacity between 1.5 to 12.0 MW: 22 (100 %) - N° of SHPs with CDM incentives: 15 (68 %) - N° of SHPs with Proinfa incentives: 6 (27 %) -N° of SHPs without incentives (CDM or Proinfa): 1 (5 %) <p>Moreover, SHPs in Brazil (from 1 MW to 30 MW) are responsible for only 2.42 % of the installed capacity and the common practice is the energy generation by large Hydroelectric and Thermoelectric power plants, that represent more than 95 % of the installed capacity.</p> <p>Therefore, the conclusion of the analysis is:</p> <ul style="list-style-type: none"> - Due the historical conditions the
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			<p>Brazilian electricity generation matrix is based on Large Hydro and Thermoelectric power plants;</p> <p>2) Due the risks associated the Small Hydro Power plants has been achieving incentives in order to be implemented.</p> <p>During validation, this barrier was removed from the PDD version 4.</p> <p>This CAR is closed.</p>
<p>CAR-12</p> <p>As per the methodology AMS-I.D, “<i>If the energy generating equipment is transferred from another activity, leakage is to be considered.</i>” Verified during site visit in the generator’s plates of the Albano Machado SHP that the equipments were repowered. PPs are requested to provide the evidences of where the equipments were installed and where the energy generated was being used before the project activity. Moreover, as the equipments for the Rio dos Índios SHP were not installed during site visit, PPs shall confirm if the equipments will be new or repowered ones (see CL 1) and in the case of repowering, the same evidences requested to Albano Machado SHP shall be provided for Rio dos Índios.</p>	B.6.3.1, B.6.3.2	<p>The equipments for the SHPs Albano Machado and Rio dos Índios are/should be new one and never before used on other similar activity. So they aren’t transferred from another activity. This information can be accessed in the manufacturer’s letter testimony (document “<i>Declaração</i>” from the Flessak company).</p> <p>Flessak is the generator’s manufactory.</p>	<p>A letter from the Albano Machado manufacturer of the generators was provided to Rina. The letter informs that the parts of the generator were from the Flessak stock and they were not used in other hydro power plant. Moreover the letter informs that the operational lifetime of the equipment is at least 30 years. The operational lifetime deemed reasonable and is according to SHP projects in Brazil.</p> <p>This CAR is closed</p>
<p>CAR-13</p> <p>PPs shall revise the PDD according to the “Guidelines for completing the simplified project design document (CDM-SSC-PDD)” (<i>data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later</i>).</p>	B.7.3.4	<p>The PDD was revised accordingly (on the page 31).</p>	<p>PDD version 2 was revised as per the guidelines requirements.</p> <p>This CAR is closed.</p>
<p>CAR 14</p> <p>PP shall justify in the PDD why the option</p>	B.5.4.1	<p>The PDD was adjusted accordingly.</p>	<p>PDD version 2 was revised accordingly. The benchmark analysis was chosen</p>

“benchmark analysis” was chosen among the others options of the investment analysis (simple cost analysis, investment comparison analysis or benchmark analysis).			because the other options could be the simple cost or the investment comparison analysis, but since the project activity has other revenues than the CDM benefits the simple cost must be discarded and there is not other investment alternative for the project sponsors. This CAR is closed
CL-1 As the Rio dos Índios SHP was under construction at the time of site visit, Rina could not check the equipments. For this reason, the PP shall provide the evidence of the equipment’s description mentioned in the table 1 of the PDD version 1. Moreover, PPs shall confirm if the equipments will be new or repowered ones.	A.2.1	As in SHP Albano Machado all the equipments should be new. Also the Project Design, Chapter 2, 2.5 Item from page 15 to 23 details the equipments.	The equipments described in the PDD are according to the ones presented in the Project Design, rev 02. The project design was provided by a third party company Rischbieter Engenharia e Serviço. This CL is closed.
CL-2 PPs are requested to provide an updated implementation chronogram for the SHP Rio dos Índios.	A.2.1	Please see the document “ <i>Cronograma_RDI_rev4</i> ” which has the updated implementation chronogram.	The revised chronogram was presented by PP. The forecasted date to start and finish the construction of the SHP was revised in the PDD version 2 as per the document “ <i>Cronograma_RDI_rev4</i> ” This CL is closed.
CL-3 Confirmed in the ANEEL website (Albano Machado: http://www.aneel.gov.br/paracemp/apl/PARACEMP_Relatorios/Paracemp_ParticipacaoAcionistaUsinas.asp?PsgUsi1=29514&PsgUsi2 ; and Rio dos Índios: http://www.aneel.gov.br/paracemp/apl/PARACEMP_Relatorios/Paracemp_ParticipacaoAcionistaUsinas.asp?PsgUsi1=30057&PsgUsi2) that Electra Power Geração de Energia S/A is the major shareholder of the SPEs with participation of 70%. PDD version 1 mentions that Electra Power Geração de Energia Ltda is the major shareholder of the SPEs. Clarify the name of the	A.3.1	Electra Power Geração de Energia S/A is the properly company name. The PDD was adjusted accordingly.	PDD version 2 was revised and the major shareholder presented is Electra Power Geração de Energia S/A. This CL is closed.

major shareholder of the SPEs.			
CL4 The project applies the methodology AMS-I.D "Grid connected renewable electricity generation", Version 15 of 16/10/2009, scope 1 that is in line with the relevant project category. However, considering the grace period (10/02/2011) for the submission of project activities for registration, when using a revised approved methodology, and the present validation timeline to submit projects for registration, it is recommended to revise the PDD according to AMS-I.D version 16, valid from 11 June 2010 onwards.	B.1.1	The PDD version 2 was revised according to the AMS-I.D version 16.	PDD version 2 applied the methodology AMS-I.D version 16. This CL is closed. (During the validation, a new version was released. The PDD version 4, was updated considering the version 17 of AMS-ID).
CL5 PDD version 1 mentions "In accordance to guidelines and rules for small-scale project activities, the emissions related to production, transport and distribution of fuel used in baseline electric units are not included in project boundary, since they do not occur at the physical and geographical locality of project". PP shall specify what <i>guidelines and rules for small-scale project activities</i> PDD refers to.	B.3.3	This information was removed from the PDD version 2.	The mentioned paragraph was excluded from the PDD version 2. This CL is closed.
CL6 Project participants shall clarify the calculations to obtain the residual value (salvage value) applied in the last year of the financial analysis.	B.5.4.4	Based on the Eletrobras document "Diretrizes para Projetos de PCH – Chapter 4 item 4.4.4" we have that the economic lifetime possible is 50 years. So in a conservative approach was adopted after 30 years a Residual Value with 40% of the Initial Investment. (100% / 50years=2% per year depreciation rate so for 30 years = 60% of the initial value depreciated).	Project participants clarified properly the calculation of the residual value. This CAR is closed.
CL7 In the spreadsheets version 1 ("IRR_AM.xls"/9/ and "IRR_RI.xls" /10/) no working capital was taken into account, and there is not its returning in the last year of the operation. PP shall explain why the working capital value was not considered in the financial analysis.	B.5.4.4	Since the project sponsor should use their own capital to the project implementation the working capital wasn't take into account. <u>Second Response</u> According to the Project Sponsor the	The working capital should be considered in the financial analysis regardless of the source of investment. As working capital we should understand as the capital required to inventories (not relevant) and accounts receivables, deducted the accounts payables. PP shall explain why

		<p>working capital doesn't represent money inflow or outflow in liquid terms. So they considered the working capital inflow use together to the equity during the construction phase and the withdraw together to the residual value at the end of 30 years.</p> <p>Also is it possible to check in the PP's Letter to the BRDE, that the working capital has not been considered.</p>	<p>the working capital value was not considered in the financial analysis.</p> <p>This CAR remains open.</p> <p><u>Second Response DOE:</u> Project participants are confident that the working capital has no significant value for the cash flow analysis.</p> <p>This CAR is closed.</p>
<p>CL-8</p> <p>The spreadsheets “IRR_AM.xls” /9/ and “IRR_RI.xls” /10/ contain financial indicators not used in the financial analysis (section 9 of the spreadsheets). PP shall exclude this section of the spreadsheets.</p>	B.5.4.5	<p>The financial indicators not used in the analysis were excluded in the spreadsheets version 2.</p>	<p>Project participants excluded not applicable information from the spreadsheets.</p> <p>This CAR is closed.</p>
<p>CL-9</p> <p>PP shall provide the evidences that the OPEs presented to the DOE are the same sent to ANEEL and clarify the difference between the documents presented for the Rio dos Índios SHP: “OPE_PCH RIO DOS ÍNDIOS 15 04 09.xls” /25/ and “OPE_RDI.pdf” /26/ .</p>	B.5.4.5	<p>The document “OPE_RDI.pdf” was produced together the first revision of the SHP Project Design by the Rischbieter' company (the company contracted responsible for the PP to develop the SHP project design). The OPE first revision has 10/09/2007 as database. The second OPE revision has 15/04/2009 as database.</p> <p>The evidences of the SHPs Project Designs delivered to the ANEEL are: SHP AM: Process nº 48500.004291/2003-44 and validated in the Dispatch 3,761 SHP RDI: Process nº 48500.002214/2003-22 and validated in the Dispatch 3,473</p> <p>Also the investment values can be cross checked against the document “Electrapower_information_to_UNFCCC.pdf” attached in the Prior Consideration delivered to the UNFCCC Executive Board (This document summarizes the project activity input values forecasted to the SHPs and was delivered before the Project</p>	<p>Verified that the investment presented to the UNFCCC in the document attached for the cdm consideration is estimated US\$ 6.45 million (AM) and US\$ 17.14 million (RDI). However, it is not possible to cross check that the mentioned OPEs are the ones sent and validated by ANEEL.</p> <p>This CL remains open.</p> <p>For Albano Machado PP has provided Project Design delivered to the ANEEL, developed by the “Rischbieter Engenharia e Serviços” (Third Party company and the project designer expert) which present the investment value as the same contained in the OPE spreadsheet.</p> <p>For the Rio dos Índios SHP PP has revised the investment that can be confirmed in the letter sent to the Bank for</p>

		<p>Activity Start date).</p> <p><u>Second Response</u></p> <p>For the SHP Albano Machado another evidence to the investment value is the page 2 of the Chapter 14 item 14.1 of the Project Design delivered to the ANEEL and developed by the “<i>Rischbieter Engenharia e Serviços</i>” (Third Party company and the project designer expert - more details about the company in http://www.rischbieter.com.br) which brings the investment value as the same contained in the OPE.</p> <p>For the SHP Rio dos Índios since the SHP didn't start the construction, the Project Proponent made the Investment Value update. So the evidence to the new investment value should be the Letter delivered to the Financial bank (BRDE – Banco Regional de Desenvolvimento do Extremo Sul).</p> <p>More details about the financial entity in http://www.brde.com.br</p>	<p>financing the project, dated 27/07/2010. Letter registered in the Bank under protocol number 67078 on 02/08/2010.</p> <p>This CL is closed.</p>
<p>CL-10</p> <p>Further information about the energy prices and its evolution shall be presented. It should be clear what is the reference date for this prices, how the value was estimated and which index will be chosen to adjust this prices over the years (For example: ...the price was defined for July/200X as R\$ Y MW/h and should be adjusted every year by the Z index). The evidences shall be presented.</p>	B.5.4.5	<p>Since the benchmark in the PDD version 2 was changed to the Selic rate this CL is no longer applicable.</p> <p><u>Second Response:</u></p> <p>The prices, costs and investment in the IRR spreadsheets were revised accordingly in the version 2.</p>	<p>Regardless of the use or not of inflation impact in the financial analysis, projects participants should present the information about prices. Project participants should assure that prices, costs and investments are in the same economic level in the first year of investment analysis. (i.e.: If the price has economic level of 2007 and costs has the economic level of 2008 and the starting date of the project is 2009, both should be updated to the starting date economic</p>

			level.) This CAR remains open. <u>Second Response DOE:</u> Project participants presented the information in the financial analysis spreadsheet with the sources of information and the reference dates. This CAR is closed.
CL-11 PPs are requested to include in the PDD the updated Installation Licenses for the Albano Machado and Rio dos Índios SHPs.	D.1.1	LI N° 03/2010-DL - Environmental Installation License from FEPAM in 04 January 2010 for the SHP Albano Machado was included in the PDD version 2. LI N° 275/2010-DL - Environmental Installation License from FEPAM in 17 March 2010 for the SHP Rio dos Índios was included in the PDD version 2.	PP version 2 included the updated installation licenses. This CL is closed.
CL-12 PP shall confirm the expected operational lifetime of the equipments according to the equipments' specification.	C.1.2	According to the manufacturer letter, document “ <i>Declaração</i> ” the expected operational lifetime is at least 30 years. Also according to the EFEI and CERNE’s ANEEL studies, the lifetime of equipments Turbines and Generators are above 30 years (easy access on Tables in pages 633 and 635). CERNE - Centro de Estudos em Recursos Naturais e Energia EFEI – Escola Federal de Engenharia de Itajubá http://www.aneel.gov.br/aplicacoes/audencia/arquivo/2006/012/documento/relatorio_vida_util_volume_2.pdf	The letter from the genetor manufacture confirms at the generators lifetime is at least 30 years. Therefore, the operational lifetime of the project activity of 30 years is correctly defined in the PDD and deemed reasonable This CL is closed.
CL-13 PP is requested to clarify and present the evidences of the O&M presented in the revised		The O&M for the SHP Rio dos Índios is now in line with the values adopted for the SHP AM (2.4% of the investment). Even though	<u>Albano Machado (AM):</u> Considering the version 1 of the spreadsheet (presented in the published

<p>documents. For The SHP Rio dos Índios, in the PDD version 1, the O&M presented was 444,000.00 R\$ per year (estimative was detailed in the spreadsheet "<i>Custos de OEM - ALM e RDI.xls</i>", provided during the site visit) and in the revised spreadsheet the value presented is 983,630.06 per year (corresponds to 2.40% of the investment).</p> <p>Moreover, for both SHPs, a new cost of 2% of the investment ("other cost") was added in the revised spreadsheets. Therefore, it is requested to PP to clarify and provide the evidences of the "other costs" applied in both SHPs as well as the detailed description of the itens and percentages that are being considered to reach the estimative of 2%.</p>		<p>this O&M value is under the public reference presented in the document "Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas - page 14" (5.0% of the investment) and also is under the value presented in the prior project design for this SHP (3.5% of the investment), evidenced in the document "CAPÍTULO 14 (ORÇAMENTO_TEXTO)" elaborated by the <i>Rischbieter Engenharia e Serviços</i> company.</p> <p>The "other cost" is not a new cost; it was considered before the Validation process start. This include mainly the Insurance and MRE (from portuguese "<i>Mecanismo de Realocação de Energia</i>") costs. MRE was presented as 4.56% of the revenues and the Insurance fee was estimated between 1 to 1.3% of the investment. But they were presented as a PP Benchmark without the evidences. In that time RINA validation team asks for the IRR spreadsheet before the PDD publication for the Stakeholders. So since the evidences didn't yet arrive the Bank and Financial Costs* and MRE information were removed from the spreadsheet. *(in the O&M Expenditures with the Insurance cost included)</p> <p><u>PP clarification</u></p> <p>The RINA impact simulation cannot be considered since has not taken in consideration the inflation rate influence at the time of the considered input values (out of the same database). Even though withdrew the <i>Mecanismo de Realocação de</i></p>	<p>PDD version 1) and revised version (presented in the PDD version 3), PP has revised the following points:</p> <ul style="list-style-type: none"> - included inflation index (due to CAR 8) -revised the O&M costs from R\$ 336,000.00 to R\$ 337,691.33 to consider the 2.4% of the investment -included the "other costs", as 2% of the investment <p>RINA has simulated the impact of the inclusion of the "other cost" in the IRR of the project activity. If the other cost is excluded in the revised of the spreadsheet (Analise_AM_carbono_infl_v2.xls), the IRR goes from 14.59% to 16.86%.</p> <p>Moreover, PP could not support with documented evidences that the "other costs" was considered at the time of investment decision.</p> <p><u>Rio dos Índios (RDI):</u></p> <ul style="list-style-type: none"> - Considering the version 1 of the spreadsheet (presented in the published PDD version 1) and revised version (presented in the PDD version 3), PP has revised the following points (Analise_RDI_carbono_infl_v2.xls): - included inflation index (due to CAR 8) -revised the investment costs from R\$ 36,745,269.82 to R\$ 40,984,586.00 -revised the O&M costs from R\$ 444,000.00 to R\$ 983,630.06 to consider the 2.4% of the investment -included the "other costs", as 2% of the investment <p>RINA has simulated the following impacts in the IRR of the project activity:</p>
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		<p><i>Energia</i> fee* (Energy Reallocation Fee in free translation), the insurance and administrative costs (these costs together represent the "other costs" in the spreadsheet).</p> <p>As per the Electrapower minute meeting from January 2009 is it possible to evidence that the PP has took in consideration the "other costs" at the time of the investment decision.</p> <p>The PP agreed to remain the SHP Rio do Índios investment parameter in R\$ 36,745,269.82 instead R\$ 40,984,586.00.</p>	Scenario 1	
			inflation	yes
			investment	R\$ 40,984,586.00
			O&M	R\$ 444,000.00
			Other cost	0 (excluded)
			IRR	17.23%
			Scenario 2	
			inflation	yes
			investment	R\$ 36,745,269.82
			O&M	R\$ 444,000.00
			Other cost	0 (excluded)
			IRR	18.75 %
			Scenario 3	
			inflation	yes
			investment	R\$ 36,745,269.82
			O&M	2.4% of investment (R\$ 881,886.48)
			Other cost	0 (excluded)
			IRR	17.46 %
			Scenario 4	
			inflation	yes
			investment	R\$ 40,984,586.00
			O&M	2.4% of investment (R\$ 983,630.06)
			Other cost	0 (excluded)
			IRR	15.79 %
			<p>According to the paragraph 6 of EB 62, annex 5, the scenario 2, that represents the inputs values used at the time of investment decision.</p> <p>Moreover, the investment of R\$</p>	

			<p>40,984,586.00 presented in the revised documents, can be confirmed in the letter sent to the Bank for financing the project, dated 27/07/2010. The inputs considered in the revised financial analysis have the reference date July/2010, that is after the period considered in the benchmark calculation. Besides that, PP could not support with documented evidences that the "other costs" was considered at the time of investment decision.</p> <p>This CL remains open.</p> <p>Rina second response: Rina verified that the PP Benchmark is presented in the Board's meeting dated 06/01/2009 /62/ and "Directions for Small Hidro Power Plants studies and projects" (from the Portuguese: "<i>Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas</i>") (5.0% of the investment) /63/. Rina verified in the board's meeting that the same values are applied in another SHP of the group. It is RINA's opinion that the values are reasonable for this kind of projects in Brazil and is insimilar to other hidro power plants such as registered projects EB ref. 2703 and 3669.</p> <p>This CL is closed.</p>
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TABLE 4 FORWARD ACTION REQUESTS

Forward action request	Reference to Table 2	Response by project participants	Validation Conclusion
FAR 1 At the time of site visit, the project was being implemented and procedures were not available. In the first verification it shall be checked training courses provided to the operational team and if data archiving and data collection procedures are properly described and implemented.	B.7.3.2	The properly documents should be available at the time of first verification.	Since the PP has committed itself to resolve the issue before first verification, we have accepted the same and however the same has to be verified during the first verification