



Voluntary Carbon Standard 2007.1

OS 7895 - 11/251

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TÜV NORD CERT GmbH	2011-06-20
Report Title:	Approved by:
Validation Report – Engenheiro Ernesto Jorge Dreher and Engenheiro Henrique Kotzian SHPs VCS Project	Eric Krupp
Client:	Project Title:
BME Rincão do Ivaí Energia S.A. and BME Capão da Convenção Energia S.A.	Engenheiro Ernesto Jorge Dreher and Engenheiro Henrique Kotzian SHPs VCS Project (JUN1120)
Summary:	
BME Rincão do Ivaí Energia S.A. and BME Capão da Convenção Energia S.A. have commissioned the TÜV NORD JI/CDM Certification Program to validate the project “Engenheiro Ernesto Jorge Dreher and Engenheiro Henrique Kotzian SHPs VCS Project (JUN1120)”, with regard to the relevant requirements for VCS project activities. The project reduces GHG emissions due to generation of electricity by exploiting the hydro energy potential. In the course of the validation, 15 Clarification Requests (CL) were raised and successfully closed. One Forward Action Request (FAR) was raised and shall be assessed in the subsequent verification (first verification is being carried out along with validation). The validation is based on the project design document, emission reductions calculation sheet, supporting documents and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfillment of the stated criteria. In detail the conclusions can be summarized as follows: - the project is in line with all relevant host country criteria (Brazil) and all relevant VCS 2007.1 Standard criteria; - the project additionality is sufficiently justified in the VCS PD; - the monitoring plan is transparent and adequate; - the calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 284,952 tCO₂e is most likely to be achieved within the 10 years (renewable) crediting period. The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.	
Work carried out by:	Number of pages:
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1 Introduction

1.1 Objective

The purpose of this validation is to have an independent third party assess the project design. In particular the baseline of the project, the monitoring plan (MP) and the compliance of the project with

- The requirements of VCS 2007.1 program guidelines;
- Requirements of the approved methodology ACM0002 – version 12.1.0;
- To assess the compliance of the project with other relevant rules, including the host country (Brazil) legislation;
- Other relevant rules, of VCS sustainability criteria are validated in order to confirm that the project design as documented is sound and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of voluntary carbon units (VCUs).

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based on ACM0002 – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” - version 12.1.0, valid from September 17th, 2010 onwards) which are included in the VCS PD and other relevant supporting documents.

The items covered in the validation are described below:

- **VCS 2007.1 & Host Country Criteria**
 - All relevant VCS 2007.1 requirements
 - Host Country requirement / criteria
- **VCS Project Description**
 - Project design
 - Project boundaries
 - Predicted project GHG emissions
- **Project Baseline**
 - Baseline methodology
 - Baseline GHG emissions
- **Project Additionality**
- **Monitoring Plan**
 - Monitoring methodology
 - Indicators/data to be monitored and reported
 - Responsibilities
- **Background investigation and follow up interviews**
- **Stakeholder Consultation**
 - Review of comments
- **Draft validation reporting with CARs, CLs & FARs, if any**
- **Final validation reporting.**

The information included in the VCS PD^{/PD/} and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual^{/VVM/}, employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of VERs. The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions.

The validation is not meant to provide any consulting to the project proponent. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 VCS Project Description

The project intends to generate electricity by exploiting the hydro energy potential of the Ivaí River, in the state Rio Grande do Sul, Brazil. The project comprises the installation of two power generation units:

- SHPP Engenheiro Ernesto Jorge Dreher: with capacity of 17.95 MW and reservoir area of 0.83 km² located in the city of Salto do Jacuí, and
- SHPP Engenheiro Henrique Kotzian: with capacity of 13.23 and reservoir area of 0.66 km² located in the city of Júlio de Castilhos,

aggregating a total installed capacity of 31.18 MW. This renewable energy project is based on the run-of-river plants with the use of the potential energy generated by the flow of the Ivaí River.

The annual energy to be produced from the project activity has been estimated to be approximately 183,172 MWh of electricity considering ANEEL (National Electrical Energy Agency)'s assured energy. The generated electricity is exported to the Brazilian National Interconnected System.

The project contributes to the sustainable development, as its activity will displace fossil fuel based generation from the grid, using clean and efficient technologies. In addition the project activity will generate jobs during construction and operation phases and contribute to improvement of power quality in the region.

1.4 Level of assurance

The validation report is based on VCS PD, ER calculation sheet, supporting documents made available to the validator and information collected through performing interviews and during the on-site assessment. The level of assurance is high.

2 Methodology

The validation of the project was carried out from March 21st to June 20th, 2011.

Preparations	:	2011-03-21
On-site validation	:	2011-03-28 to 2011-04-01

Draft Reporting : 2011-04-01
 Final Reporting : 2011-06-20

The validation consisted of the following three phases:

- a desk review of the project design and the baseline and monitoring methodology
- follow-up interviews
- the resolution of outstanding issues and the issuance of the final validation report and opinion

According to the VCS 2007.1 policy, validations shall be completed within two years of the project starting date (2009-07-01), or within 1 year of 18 November 2008, whichever is later. The date of validation final report issuance is 2011-06-20, which is prior to 2011-06-30, i.e. within 2 years of project starting date.

2.1 Review of Document

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical literature referring to the project design or to the basic conditions and technical data.

The documents that were considered during the validation process are given in chapter 5 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 5.1)
- Background investigation and assessment documents (Table 5.2)
- Websites used (Table 5.3).

2.2 Follow-up Interviews

During this visit, as well as earlier and after, interviews with the project proponent, the consultant, project stakeholders and with local authorities had been carried out to confirm selected information and to resolve issues identified in the document review.

The key interviewees and main topics of the interviews are summarized in Table 2-1.

Table 2.1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
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Interviewed Persons / Entities	Interview topics
- Project proponent representatives - Consultants	- Chronological description of Project - Technical details of the project realization – specification, engineering, operational life time - Equipment Performance data - Monitoring and measurement equipment - Project activity starting date/ commissioning date - Crediting period - VER allocation /ownership - Baseline study assumptions - Sustainable development issues - Analysis of Environmental Impact - Analysis of local stake holder consultation - Roles & responsibilities, competency and training of the staff members w.r.t project management, monitoring and reporting - Operational Data - technical specification, capacity, estimated life time of the project plant units - Editorial aspects of PD - Procedural aspects - Debundling aspects - Base line study, project emissions, leakage and additionality - Details of emission reduction calculation

The detailed list including the functions or designations of the interviewed persons is given in chapter 5.

2.3 Resolution of any material discrepancy

The report includes Corrective Action Requests (CARs), Clarification Requests (CLs) and Forward Action Requests (FARs) identified in the course of this validation.

A Corrective Action Request is established if:

- mistakes have been made in assumptions or the project documentation which directly will influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered by the UNFCCC or that emission reductions cannot be verified and certified.

A Clarification Request is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A Forward Action Request is raised if any information cannot be assessed during the validation and shall be checked during the first verification.

After resolution of the CARs and CLs by the project proponent, the validator will issue the (final) validation report and opinion.

In this validation, 12 CLs and 01 FAR were raised. Please refer to Section 3. The findings are documented in the validation report and summarized in table 2.2 below.

Table 2-2: Summary of CARs, CLs and FARs issued

Validation topic ¹⁾	No. of CAR	No. of CL	No. of FAR
General description of project activity (3.1) - Project boundaries - Participation requirements - Technology to be employed - Contribution to sustainable development	-	01	01
Project baseline (3.2) - Baseline Methodology - Baseline scenario determination - Additionality determination	-	-	-
Monitoring plan (3.3) - Monitoring Methodology - Monitoring of Project emissions Baseline emissions Leakage Sustainable development indicators / environmental impacts - Project management planning	-	10	-
Emission Reduction Calculations (3.4) - Calculation of GHG emission reductions Project emissions Baseline emissions Leakage - Emission reductions	-	03	-
Environmental impacts (3.5)	-	01	-
Stakeholder Comments (3.6)	-	-	-
SUM	0	15	01

1) The letters in brackets refer to the validation protocol

For an in depth analysis/evaluation of all CARs and CLs can be referred to the below sections from 3.1 to 3.6.

3 Validation Findings

3.1 Project Design

The project comprehends the generation of electricity by two SHPPs, exploiting the hydro energy potential of the Ivaí river, in the state Rio Grande do Sul, Brazil, with a total installed capacity of 31.18 MW, avoiding the use of fossil fuel generated electrical energy.

Key parameters of the project are as below:

Table 3.1.1: Technical Data – SHPP Engenheiro Ernesto Jorge Dreher

Parameter	Value
Turbines	
Type	Francis
Quantity	5
Power (kW)	3 X 5,912 (Serials: 2054; 2055; 2056) – HISA 1 X 315.43 (Serial 1240) – Bee WIRZ 1 X 483 (not yet installed)
Nominal Flow (m ³ /s)	3 X 11.40 1 X 2.36 1 X 3.60
Water Head (m)	3 X 57.5 2 X 15
Generators	
Type	Synchronous
Quantity	5
Power (kW)	3 X 5,715 (Serials: 1002920435; 1002284713; 1002492272) – WEG 1 X 326.3 (Serial 16425) – Equacional 1 X 480 (not yet installed)
Frequency (Hz)	60
Others	
Reservoir Area (km ²)	0.83
Power Density (W/m ²)	21.63
Installed Capacity (MW)	17.95
Assured Energy (MW)	12.24
Plant Load Factor (%)	68

Table 3.1.2: Technical Data – SHPP Engenheiro Henrique Kotzian

Parameter	Value
Turbines	
Type	Francis
Quantity	3
Power (kW)	4,529 (Serials: 2057; 2058; 2059) – HISA
Nominal Flow (m ³ /s)	3 X 16.08
Water Head (m)	31.21
Generators	
Type	Synchronous
Quantity	3
Power (kW)	4,410 (Serials: 1001901747; 1001901746; 1001523429) – WEG
Frequency (Hz)	60
Others	
Reservoir Area (km ²)	0.66
Power Density (W/m ²)	20.05
Installed Capacity (MW)	13.23
Assured Energy (MW)	8.67
Plant Load Factor (%)	65

Table 3-2: Project Location

	Location
Host Country	Brazil
Region:	Cities of Salto do Jacuí and Júlio de Castilhos - State of Rio Grande do Sul, South Region
Latitude:	29°07'13" S (SHPP Eng. Jorge Dreher) 29°07'34" S (SHPP Eng. Henrique Kotzian)
Longitude:	53°22'04" W (SHPP Eng. Jorge Dreher) 53°19'06" W (SHPP Eng. Henrique Kotzian)

This project does not participate in any other project emission-trading program and was not rejected in other GHG programme.

This project is eligible under the VCS methodology as long as it fulfils all applicability criteria of the methodology used. The project consists of energy generation by two SHPPs.

There are no similar CDM projects activities in the project sites as could be evidenced in the UNFCCC website.

The project activity will contribute to the sustainable development of the region, as it reduces the energy consumption from the national grid. The participation is voluntary.

The emission reduction was not double counted.

Table 3-3: Project Timeline

Timeline	Date
Project start date	2009-07-01 –SHPP Engenheiro Ernesto Jorge Dreher started inputting energy into the National grid
Start date of the 1 st Crediting Period	2009-07-01
End of date of the 1 st Crediting Period	2019-06-30
Crediting period	10 years, renewable
Total project lifetime	30 years

Table 3-4: Proof of title

Project Participant	Proof of title
BME Rincão do Ivaí Energia S.A.	Owner of SHPP Engenheiro Ernesto Jorge Dreher – General Meeting of <i>Constitution of Rincão do Ivaí Energia S. A.</i> – Date: 2006- 11-10 and ANEEL's website publication (http://www.aneel.gov.br/aplicacoes/capacidadebrasil/energiaassegurada.asp)
BME Capão da Convenção Energia S.A.	Owner of SHPP Engenheiro Henrique Kotzian – General Meeting of <i>Constitution of Capão da Convenção Energia S. A.</i> – Date: 2006- 11-17 ANEEL's website publication (http://www.aneel.gov.br/aplicacoes/capacidadebrasil/energiaassegurada.asp)

Nevertheless, a CL was raised and closed. In addition, a FAR was raised to be checked during the next verification:

Finding	CL 01		
Classification	☐ CAR	☒ CL	☐ FAR

Finding	CL 01
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In section 1.16, please clarify why this section should not be applicable or fill it up properly.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The section was filled properly.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section 1.16 now presents a description about the process of calculation of the emission factor. In addition there is a reference for the information about the eligibility of the project which is provided in sections 2, 3 and 4. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements
Finding	FAR 01
Classification	☐ CAR ☐ CL ☒ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	As verified during the site visit (end of March 2011), the generator and turbine #5 of SHPP Jorge Dreher has not been installed yet. The installed capacity shall be checked during subsequent verification (first verification is being carried out along with validation).
Proposed Corrective Action #1 <i>This section shall be filled by the PP. It shall address the proposed corrective action in details.</i>	The evidences of the installation will be presented to the verification team when appropriate.
DOE Assessment #1 <i>The assessment of the proposed corrective action. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Proposed action accepted.
Conclusion <i>Tick the appropriate checkbox</i>	☒ To be checked during the first periodic verification ☐ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements

3.2 Baseline

The selected baseline methodology is the approved baseline methodology “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (ACM0002 - version 12.1.0).

The project satisfies all applicability criteria of the methodology. The information given in the section 2.2 of the VCS PD was reviewed by the validation team and has been assessed as correct based on the technical specification of project activity submitted to the validation team. Thus the DOE conclude that the project does not involve the addition of renewable energy generation units at an existing renewable power generation facility nor does the project activity involves retrofitting or modification of existing facility for renewable energy generation.

The selected baseline methodology, i.e. ACM0002, is correctly applied to this type of grid connected renewable generation project. There is no methodology deviation or revision.

Table 3-5: Assessment of Baseline Identification

☒	Baseline is not identified (i.e. it is given by the baseline methodology)
☐	Assessment of baseline see below

As per the approved methodology ACM0002, the baseline is 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 generating sources, as reflected in the combined margin (CM) from ‘Tool to calculate the emission factor for an electricity system’.*”

The project activity uses as data source for the Emission Factor calculation of National Interconnected System (SIN), the operating margin and the build margin coefficients provided by the Brazilian Designated National Authority. The method used to make this calculation is the dispatch analysis method and it is briefly described in section 4.1 of VCS-PD.

3.3 Additionality

The additionality was demonstrated in the VCS PD as per the section 5.8, of the VCS 2007.1. The PP had chosen Test 1 (Project Test) to prove additionality.

Under Step 1 (Regulatory Surplus) it has been assured that the project has not been undertaken to meet any national or local regulatory requirements. The same was checked by studying the orders and regulations of national and state ministries, about any mandates regarding hydro projects.

Under Step 2 (Implementation Barriers), Investment Barriers have been chosen. The validation team has done thorough check of the documents submitted to cross check each claim of additionality. Interviews and consultation of background documents and websites were also conducted to make this assessment.

Step 3 (Common Practice Analysis) has been found to be in line with chapter 7 of guidance on GHG protocol for project accounting. The demonstration of common practice has been found to be acceptable.

Table 3.6: Additionality assessment

Step # Barrier	Demonstration	Assessment
Step 1: Regulatory Surplus	Project is not implemented to meet any applicable local and national regulatory requirements. This was confirmed by conducting document review and considering the local expertise of validation team.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier
Step 2: Implementation barrier	<u>Investment barrier:</u> PP has chosen <u>Project IRR</u> as financial indicator <u>and 5 year average SELIC rate</u> as benchmark.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier
Step 3: Common Practice Analysis	Regarding common practice barrier, the statistics provided by the PP reveal that at the time of installation of the project activity, from 356 SHPPs in Brazil, just one has been implemented without any kind of financial incentives (Brazilian program of Incentives – PROINFA or CDM).	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier The validation team is convinced that the implementation of small hydro power projects is not a common practice in the project sites.
Assessment of the validation team		☒ Project is additional ☐ Project is not additional

Table 3.7.1: Financial Parameters – SHPP Engenheiro Ernesto Jorge Dreher

Parameter	Value applied	Unit	Source of Information	DOE Assessment (Comments)
Investment	55,275,144	R\$	- Table of Uses and Sources (QUF) – Rincão do Ivaí Energia S. A. - Letter reporting the expenses of the financial operations of SHPP Dreher and SHPP Kotzian – CEF	The investment is given by the loan contract and a letter from the bank which demonstrates the expenses that are greater than the estimates, which was considered conservative by the validation team
Net Power	12.24	MW	List of assured energy – ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Installed power	17.95	MW	List of assured energy – ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Net Generated electricity	107,222.40	MW/y	List of assured energy – ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Exchange rate (Dollar to Real)	1.91	R\$	Central Bank of Brazil	Official value given by Central Bank of Brazil
Power Purchase Agreement	143.22	R\$/MWh	Power Purchase Agreement #001/2007	Value given by the signed PPA between the project owner and the energy buyer.
Concession	30	year	Authoritative Resolution #134 - ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Construction	2	year	Effective time	The real construction time
Operation	30	year	Authoritative Resolution #134 - ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Social Contribution Program (on gross revenue)	0.65	%	Law #10637	Percentage given by law
COFINS (on gross revenue)	3	%	Law #9718	Percentage given by law
Calculation Base for In-	8	%	Laws # 9718 and	Percentage given by law

come Tax - according to tax modality <u>as-sumed (vain) profit</u>			10637	
Income Taxes (on presumed profit)	15	%	Laws # 9718 and 10637	Percentage given by law
Additional Income Taxes (on presumed profit)	10	%	Laws # 9718 and 10637	Percentage given by law
Calculation Base for Social Contribution Tax -according to tax modality <u>assumed (vain) profit</u>	12	%	Laws # 9718 and 10637	Percentage given by law
CSLL (on presumed profit)	9	%	Laws # 9718 and 10637	Percentage given by law
Carbon credits	7.00	US\$/tC O ₂	Forecast of the consultant of project activity (Carbotrader)	Forecast of carbon market
VCUs	17,520	tCO ₂ /y	Calculations of the consultant of project activity (Carbotrader)	Calculated value
Bank fees	412.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters.
Maintenance	165,900.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Commercialization (on gross revenue)	1.20	%	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Administration (on gross revenue)	2.50	%	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Insurance (over investment)	2.80	%	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Depreciation (over invest-	2.00	%	Lifetime and Depreciation Study –	Academic third party study within the market

ment)			Federal Engineer School of Itajubá	parameters
Transport Displacement Travel	1,750.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Communication and phone	500.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Employees	5	un	Effective hired employees	The real number of employees
Salaries	3,060.00	R\$/un	Effective paid salaries	The real expenses
MRE/MRA - energy reduction (over generation)	5	%	- Operational Agreement between Rincão do Ivaí Energia S. A. and CEEE - Proposal of Generation Relief System #201008100701 -106 between Belo Monte Energia (BME) and Sul Engenharia e Sistemas Ltda. - Contract of Generation Relief System between Rincão do Ivaí Energia S. A. with Sul Engenharia e Sistemas Ltda.	All documents demonstrate the commitment of the project owner to reduce the generation if necessary. It is a contractual obligation.
Miscellaneous material	485.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
ANEEL - Fiscalization fee	2,478.07	R\$/month	Federal Decree #2410	Percentage given by law
Distribution Use of System Charge - TUSD	1.50	R\$/kWh	- Resolution #452 – ANEEL - Normative Resolution #77 – ANEEL	Original value of the TUSD is determined by ANEEL's Ratifying Resolution number 452 as R\$2.99 / kW. The reduction of 50% is re-

				gulated by ANEEL's Normative Resolution number 77.
Fair Value (on investment)	40	%	Lifetime and Depreciation Study – Federal Engineer School of Itajubá	Academic third party study within the market parameters

Table 3.7.2: Financial Parameters – SHPP Engenheiro Jorge Kotzian

Parameter	Value applied	Unit	Source of Information	DOE Assessment (Comments)
Investment	54,633,910	R\$	- Table of Uses and Sources (QUF) – Capão da Convenção Energia S. A. - Letter reporting the expenses of the financial operations of SHPP Dreher and SHPP Kotzian – CEF	The investment is given by the loan contract and a letter from the bank which demonstrates the expenses that are greater than the estimates, which was considered conservative by the validation team
Net Power	8.67	MW	List of assured energy – ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Installed power	13.23	MW	List of assured energy – ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Net Generated electricity	73,949.20	MW/y	List of assured energy – ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Exchange rate (Dollar to Real)	1.91	R\$	Central Bank of Brazil	Official value given by Central Bank of Brazil
Power Purchase Agreement	143.22	R\$/MWh	Power Purchase Agreement #001/2007	Value given by the signed PPA between the project owner and the energy buyer.
Concession	30	year	Authorizative Resolution #134 - ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Construction	2	year	Effective time	The real construction time

Operation	30	year	Authorizative Resolution #134 - ANEEL	Official value given by ANEEL (Electric Energy National Agency)
Social Contribution Program (on gross revenue)	0.65	%	Law #10637	Percentage given by law
COFINS (on gross revenue)	3	%	Law #9718	Percentage given by law
Calculation Base for Income Tax - according to tax modality <u>assumed (vain) profit</u>	8	%	Laws # 9718 and 10637	Percentage given by law
Income Taxes (on presumed profit)	15	%	Laws # 9718 and 10637	Percentage given by law
Additional Income Taxes (on presumed profit)	10	%	Laws # 9718 and 10637	Percentage given by law
Calculation Base for Social Contribution Tax -according to tax modality <u>assumed (vain) profit</u>	12	%	Laws # 9718 and 10637	Percentage given by law
CSLL (on presumed profit)	9	%	Laws # 9718 and 10637	Percentage given by law
Carbon credits	7.00	US\$/tC O ₂	Forecast of the consultant of project activity (Carbotrader)	Forecast of carbon market
VCUs	12,410	tCO ₂ /y	Calculations of the consultant of project activity (Carbotrader)	Calculated value
Bank fees	352.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters.
Maintenance	112,100.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters

Commercialization (on gross revenue)	1.20	%	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Administration (on gross revenue)	2.50	%	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Insurance (over investment)	2.80	%	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Depreciation (over investment)	2.00	%	Lifetime and Depreciation Study – Federal Engineer School of Itajubá	Academic third party study within the market parameters
Transport Displacement Travel	1,250.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Communication and phone	500.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
Employees	4	un	Effective hired employees	The real number of employees
Salaries	3,060.00	R\$/un	Effective paid salaries	The real expenses
MRE/MRA - energy reduction (over generation)	5	%	- Operational Agreement Capão da Convenção Energia S. A. and CEEE - Proposal of Generation Relief System #201008100701-106 between Belo Monte Energia (BME) and Sul Engenharia e Sistemas Ltda. - Contract of Generation Relief System between Capão da Convenção Energia S. A.	All documents demonstrate the commitment of the project owner to reduce the generation if necessary. It is a contractual obligation.

			with Sul Engenharia e Sistemas Ltda.	
Miscellaneous material	485.00	R\$/month	Estimates of Mr. Benoni Hedlund (SHPP specialist)	Estimates of a hired specialist within the market parameters
ANEEL - Fiscalization fee	1,826.46	R\$/month	Federal Decree #2410	Percentage given by law
Distribution Use of System Charge - TUSD	2.99	R\$/kWh	- Resolution #452 – ANEEL - Normative Resolution #77 – ANEEL	Original value of the TUSD is determined by ANEEL's Ratifying Resolution number 452 as R\$2.99 / kW. The reduction of 50% is regulated by ANEEL's Normative Resolution number 77.
Fair Value (on investment)	40	%	Lifetime and Depreciation Study – Federal Engineer School of Itajubá	Academic third party study within the market parameters

Benchmark: the SELIC rate was chosen as the benchmark. It is considered as a conservative rate and is the basis for all interest rates in Brazil. The period from 2002 to 2007, totaling 5 years before the investment decision, was used to calculate the average SELIC rate (18.29%). The period of 5 years was chosen because the average rate of a longer period is more adequate to compare with the applied 30 years project IRR financial analysis. The peaks of the rate are not included in the average period and a 5 years period provides a better framework of the Brazilian economy, as it comes from a very oscillating period and could not be taken as stable by the time of the management decision.

Sensitivity analysis:

The Guidance on Assessment of Investment Analysis requires the robustness of the conclusion arrived at to be proved through a sensitivity analysis by varying the critical assumptions to a reasonable variation ($\pm 10\%$). The PP has identified the following parameters as the most critical assumptions:

- Investment;
- Energy Price;
- Assured Energy;
- O&M Costs;

According to the sensitivity analysis (breakeven point) done by the PP, even with a variation of $\pm 15\%$ for any given parameter above, the IRR would not cross the benchmark return as given in tables 8 and 9 of VC-PD;

Nevertheless, 09 CLs were raised as follows:

Finding		CL 02		
Classification		☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>		Please reference transparently and <u>precisely</u> the sources for all input data used in the Financial Analysis in the financial spreadsheet and/or VCS PD. Further please include in: - income tax calculation base %; - social contribution calculation base %; - additional income tax. Moreover, in tab 'cash flow' please include a line for social contribution calculation base (currently inside a formula).		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>		- Income tax calculation base was included (line 21); - Social contribution calculation base was included (line 22); - Additional income tax was included (line 25); - The line for social contribution calculation base in cash flow tab was included (lines 39 for Eng. Jorge Dreher spreadsheet and 40 for Eng. Henrique Kotzian spreadsheet).		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>		The sources and references for all input data used in the Financial Analysis have been included in the documentation. The data for income tax calculation base, social contribution calculation base and additional income tax was added in tab 'Input data' of the excel spreadsheet. And also, a separate line for social contribution calculation base was inserted. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>		☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		
Finding		CL 03		

Finding	CL 03		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The value for total investment considered in the financial analysis is the one given by the financing contract with CEF (State Owned Federal Bank). Please present further supporting evidence to support the total investment applied.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	A letter from Stated Owned Federal Bank (financing agent) evidencing the values declared on financial spreadsheets is provided as supporting evidence for total investment values. Please, check the document issued in 6 April 2011.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The letter from Caixa Econômica Federal states as total investment of R\$ 64,048,509.53 for SHPP Engenheiro Ernesto Jorge Dreher and R\$ 79,967,875.20 for SHPP Engenheiro Henrique Kotzian instead of the values of R\$ 55,275,144.46 and R\$ 54,633,910.20 respectively, presented in the financial analysis of each SHPP. Please, clarify the differences in the values. <u>CL remains open</u>		
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The total investment values to SHP Engenheiro Ernesto Jorge Dreher and SHP Engenheiro Henrique Kotzian were estimated at the time of investment decision as R\$ 55,275,144.46 and R\$ 54,633,910.2 respectively as demonstrated in the document "Quadro de Usos e Fontes" (database from 08/2007) provided to the DOE (this document is part of the financing contract signed with the financial entity). The values of R\$ 64,048,509.53 and R\$ 79,967,875.20 are the final investment costs which were greater than the forecasted to both plants at the time of investment decision.		
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The difference between the values presented in the letter from Caixa Econômica Federal and the ones presented at the financial analysis is due to the increase in the implementation costs in both SHPPs because of the time lapse (2007 – 2011). As the PP has used the most conservative figures in the analysis, the validation team deemed acceptable the evidences about the total investment. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Finding	CL 04		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	For O&M costs, the source for the value for several cost items is third party consultant Benoni Hedlund. Please present additional evidence to support such costs (e.g. public sources for O&M costs expressed as percentage of total investment or R\$/MWh; proved historical costs of similar projects, etc).		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	According the report "Guidelines for studies and projects of Small Hydropower Plants" (from the Portuguese Diretrizes para estudos e projetos de Pequenas Centrais Hidrelétricas) issued on January 2000 by ELETROBRÁS (page 18), the O&M costs to SHPP projects should be estimated in 5% of its total initial investment value. This report is provided as additional evidence to the values presented in the PD which are both smaller than 5%.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	An official report of ELETROBRÁS (National Electric Utility Company – State Owned) has been presented. In this report, there is an estimate of 5% of the total investment in O&M. In the PP's estimates 3.3% of the total investment of SHPP Engenheiro Henrique Kotzian and 4.7% of the total investment of SHPP Engenheiro Ernesto Jorge Dreher for O&M costs. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Finding	CL 05		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please provide evidence to support the assumption of 5% reduction due to MRE (Energy Reallocation Mechanism).		

Finding	CL 05
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It is provided as evidence the operative agreement signed between BME Rincão do Ivaí e BME Capão da Convenção and CEEE, and the contract signed between the BME Rincão do Ivaí and BME Capão da Convenção and Sul Engenharia e Sistemas to provide a relief generation system. Both the documents are about operational systems necessary to obey the generation limitations imposed on power generators that dispatch their energy through the National System Operator – ONS. This dispatch limitations are about 5%, value estimated by Mr. Benoni Hedlund (third party) based on previous experiences with SHPPs implantation in Brazil. Also, a declaration of Mr. Hedlund about this issue is provided as additional evidence.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The Operative Agreement between the project owners and CCEE, the contract between the project owners and Sul Engenharia e Sistemas and the letter from Mr. Benoni Hedlund (SHPP specialist) were presented. In all these documents, the reduction due to MRE is stated. The documents are deemed acceptable by the validation team. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding	CL 06
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The reduction of 50% of the TUSD, applicable to small scale hydro projects under the ANEEL definition (below 30MW) has not been considered. In order to be conservative please consider such reduction in the cash flow. Likewise, please clarify/justify why the REIDI incentives were not considered in the financial analysis.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	- The reduction of 50% of the TUSD was applied (see cells C41 of financial spreadsheets); - The not consideration of REIDI in the financial analysis is justified by Mr. Hedlund in the letter provided to DOE as additional evidence, attached to this report.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of</i>	The reduction of 50% was applied and the values are now updated to R\$ 1.50 R\$ per kW, instead of R\$ 2.99.

Finding	CL 06
<i>non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Please, make a reference that the original value of the TUSD was reduced because of the ANEEL benefit. A letter from Mr. Benoni Hedlund (SHPP specialist hired to perform the financial analysis) was presented in which is stated that the REIDI benefits have not been considered as they were quite new (Law 11488 – June/2007) when the SHPPs implementation decision were taken (July/2007). The rules were not clear for the project owners and so, they were not taken in account for the investment decision and are not part of the investment analysis. Please, clarify why the rules were not clear, if stated by law, or if there was any other reason for the REIDI benefits not been taken in account for the analysis. <u>CL remains open</u>
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The original value of the TUSD (distribution system use charge) is determined by the Ratifying Resolution number 452 issued by ANEEL in 18 April 2007 as R\$2.99 / kW, but due to the ANEEL Normative Resolution number 77 issued in 18 august 2004, the small hydropower ventures were benefited with the reduction of 50% of this charge. Thus, the TUSD value used at the financial spreadsheet of project activity was R\$1.50 /kW. It was mentioned in the financial spreadsheet. The Normative Resolution number 77 issued by ANEEL can be viewed through the link http://www.aneel.gov.br/cedoc/bren2004077.pdf About the REIDI (Special Incentives for the Development of Infrastructure established by the Law 11,488 of 15 June 2007) we have that: On August 2007 when the investment decision was taken, the project owners considered well known established parameters available months before (as explained by the Financial Consultant at the meeting with the DOE auditors). On July 2007 it was not possible to forecast the REIDI financial impacts over the ventures cash flow because it had recently been launched. To prove it, it's necessary to highlight that at the time of the investment decision (August 2007), the SHPP projects were not subscribed to access the REIDI benefits, and therefore it couldn't be considered in the financial analysis. The Decree nº 6,144 issued on 03 July 2007, defined the REIDI subscription rules and procedures. Also, these subscription rules and procedures were well established by the Normative Instruction issued on 25 July 2007. So both of them were issued just at the month before the in-

Finding	CL 06
	vestment decision be taken, so few time to create a knowledge about this issue and the financial impacts over the project activity. The Decree n° 6,144/2007 above mentioned was also changed by Decree n° 6,416 issued on 28 March 2008, therefore seven months after the investment decision (signature of PPA), showing that the mechanisms to REIDI subscription were still not totally defined and did not give security to investors on consider it .
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The TUSD benefit has been applied to the calculations and a reference for the 50% reduction is included in the excel spreadsheet. REIDI: the PP states that only well known parameters have been used in the financial analysis. As the REIDI was quite new and at the time of the investment decision SHPP projects were not yet subscribed to REIDI benefits, such a parameter could not be considered in the financial analysis. Although REIDI is a benefit created by law which gives benefits to projects as the project activity, it was not very common sense its use by the time of the management decision, so it is deemed plausible by the validation team not to consider it in the calculations. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding	CL 07		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Step 3, <u>Common Practice</u>: 1. Please clearly indicate the geographical scope of the analysis (host country); 2. It is not adequate not consider projects before the Kyoto Protocol became effective. The use or not of incentives (CDM, PROINFA, etc) shall be analyzed under the comparison of project with similar activities in the host country. Please revise; 3. Please align the date of projects to be considered in the common practice analysis to the investment decision (see CL below) in Table 14.		

Finding	CL 07
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	1. The geographical scope was indicated; 2. To establish a comparative analysis between projects implemented with or without incentives, we do need consider the date when the incentives periods became available, and both the main incentives to SHPPs projects in Brazil (Proinfa and CDM) have become available in the year of 2005. For this reason the common practice analysis considered the period of January 2005 to July 2007, since the investment decision was taken on august 2007 (evidenced by PPA signing). 3. The date was aligned.

Finding	CL 07
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	1. OK, the geographical scope has been established and it is deemed appropriate; 2. The projects which received <u>carbon</u> incentives (CDM, VCS, etc) can be excluded from the common practice analysis according to VCS criteria, but the dates where incentives (either CDM or PROINFA) become available cannot be accepted as a criterion to select “similar” projects to be included in the common practice analysis. For example, according to this approach followed in the VCS PD, if a project has started operations at the end of 2004, it was excluded from common practice analysis, even if it did not receive any incentives. This cannot be accepted, unless another criterion is set and justifies the exclusion of older projects. After the list of <u>similar</u> projects according to all <u>justifiable</u> criteria is reached, it shall then be indicated which projects received incentives (such as PROINFA) in order to demonstrate the number of similar projects implemented <u>without</u> incentives (if any); 3. The investment decision was taken on August 2007 and PP considered projects that started operations till July 2007. It would be more adequate to consider in the analysis, projects that <u>became operational</u> until the beginning of operation of the project activities (unlike the investment decision) as there is sometimes quite a long time lapse between investment decision and beginning of operation, i.e. the current criteria cause the exclusion from the list of similar activities projects that had the investment decision (if any) around the same time of the investment decision for the project activity – it is not adequate to exclude such projects from analysis (if any fits this condition). <u>CL remains open</u>

Finding	CL 07
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	2 and 3. The time range criteria considered to common practice analysis was adjusted accordingly. Now it is starting with the new Brazilian Electrical Sector model begin (described at the table 11 of the PD), when the private sector found a reasonable environment for the SHP investment. It has as legal milestone the Federal Government Decree number 5,163 issued on July 2004. The Decree defines the energy commercialization model and granting procedures to the electricity generation, making the energy generation environment accessible to the investors. Also in the new analysis was considered projects that became operational until August 2009 (starting date of project activity). The similar activities and the financial incentives received for each one are listed at the tables 12 and 13 of the PD in order to demonstrate the number of project implemented without incentives.

Finding	CL 07
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	All the section was revised and an analysis with projects from 2004 (when the rules of the energy model was changed in Brazil by the new requirements) was done. The PP revised the Common Practice analysis: on 2009, there were 2,180 plants generating electric energy in Brazil. From them, 356 were small hydropower plants. The filters and result analysis is: - 356 SHPPs operating until December 2009; - 110 SHPPs became operational between the implementation of the new model of energy market (July 2004) and December 2009; - 100 SHPPs became operational between the implementation of new market model and the starting date of project activity; - 42 SHPPs are in the range of installed power similar to project activity (50% above the installed capacity of SHPP Engenheiro Ernesto Jorge Dreher and 50% below the installed capacity of SHPP Engenheiro Henrique Kotzian; - 28 SHPPs have not received CDM benefits; From these 28, 27 received the PROINFA benefit (governmental program of incentives for energy generating plants). So, just one SHPP that did not receive the any benefit. By the analysis, it is deemed clear that the implementation of SHPPs without financial incentives is not a common practice in Brazil. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding	CL 08		
Classification	☐ CAR	☒ CL	☐ FAR

Finding	CL 08
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In section 2.5, table of milestones of the projects (Tables 14 and 15), please: a) clearly indicate the of investment decision and the related events; b) please include the date of signature of financing contract; c) include milestone related to contracts for main civil works; d) indicate that the date of the signature of the contract of purchase of turbines and generators.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	a) The investment decision has been indicated as the date of PPA signature. b) The dates of signature of financing contracts were included; c) The milestone related to main civil works were included; d) The date of signature of purchase contract of turbine and generators was included (for both plants).
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The timeline of events was updated for both SHPPs and now it is clearly defined: a) the investment decision – 2007/08/20 (both SHPPs). The signature of the PPAs has been considered as a there is a commitment of the project owners to provide all electric energy contracted if or without production of the SHPP; b) date of signature of financing contract – 2007-12-19 (both SHPPs); c) date of contracts for main civil works – 2007-12-02 (SHPP Eng. E. Jorge Dreher) and 2008-03-15 (SHPP Eng. Henrique Kotzian); d) date of the signature of the contract of purchase of turbines and generators – 2007-12-04 (SHPP Eng. E. Jorge Dreher) and 2007-12-06 (SHPP Eng. Henrique Kotzian). <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding	CL 09		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section 3.3 please include monitoring frequency and revise the QA/QC procedures for A _{PJ-JD} and A _{PJ-HK} .		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The monitoring frequency was included and the QA/QC procedures were revised.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The monitoring frequency of parameters A _{PJ-JD} and A _{PJ-HK} were revised will be annual. The QA/QC procedures have been established. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Finding	CL 10		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section 3.3, for parameter EG _{facility,y} , please indicate: - Include that EG_{facility,y} = EG_{PJ,y} - How many meters; - Function (main, back-up); - Type (uni-bidirectional); - Accuracy class or max error range of meters; - Calibration frequency; - Revise source of data (project owner).		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	- EG_{facility,y} = EG_{PJ,y} was included; - The number of meters was included; - Their function was included; - Their type was included; - Their accuracy class was included. - The reference to national standard that states the calibration frequency has included; - The source has been revised.		

Finding	CL 10
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section 3.3, parameter $EG_{\text{facility},y}$: a. it was included that $EG_{\text{facility},y} = EG_{PJ,y}$; b. there are 2 meters; c. one meter is the main one and the other is the back-up; d. they are unidirectional; e. they are class 0.2; f. it is necessary to provide the calibration frequency, according to Brazilian standards; g. the meters will comply with ONS requirements. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding	CL 11
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In section 2.5, no conclusive justification has been provided why the average SELIC rate of the years 2002 to 2007 is adequate for the decision making of the project activity in 2007. Two years before decision making there is a clear trend showing the decrease of the SELIC rate. Similar CDM projects with investment decision in 2006/2007 presented an average benchmark of 13.8% and only projects with investment decision from 2002 to 2005 have an average benchmark around 18%. Please give proper justification. In addition, please present the 5-year average calculation of the SELIC rate (i.e. excel spreadsheet).
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Please, see the answer attached (CL B10_answer). The excel spreadsheet with the 5 year average calculation of the SELIC (Selic_reta_v1) is being provided.

Finding	CL 11
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	An extensive explanation about appropriateness of the period of 5 years average calculation of the SELIC rate is provided in the presented answer. The PP shows by graphs and statements that the peaks of the rate are not included in the average period but the 5 years period provides a better framework of the Brazilian economy, as it comes from a very oscillating period and could not be taken as stable for the project owners by the time of the management decision. The explanation was deemed acceptable by the validation team as Brazil had several periods of turbulence before the actual stability and several investors took some time to adjust their financial decisions to the new reality. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.4 Monitoring Plan

The proposed project used CDM approved methodology ACM0002: "Consolidated monitoring methodology for grid-connected electricity generation from renewable sources" – version 12.1.0. The application of monitoring methodology was assessed as correct.

The methodology requires monitoring of:

- net electricity generation supplied to the grid by renewable technology installed by the project proponent the project generations and measurement system ($EG_{\text{facility},y}$);
- total electricity (TEG_y)
- emissions factors ($EF_{\text{grid,CM},y}$, $EF_{\text{grid,OM-DD},y}$ and $EF_{\text{grid,BM},y}$);
- installed capacity (Cap_{PJ});
- reservoir area (A_{PJ})

As per the monitoring plan, the measurement system measures and records the energy. There are three pairs (one main and one backup) of meters to register the energy generation of project activity. There is one pair installed at the powerhouse of each plant and a third pair at the Substation of Salto do Jacuí Hydro-

power, where the energy generated by project activity is delivered to the grid (delivery point). The meters are completely independent from the other hydropower plant and provides a separate measurement.

This third pair of meters will record the energy generated by both plants together as SHPP Engenheiro Ernesto Jorge Dreher and SHPP Engenheiro Henrique Kotzian share the same transmission line.

The measurement system contains also a communication system that has the function of sending the dispatched electricity data via satellite link both to Coprel (operator of the plants) and BME (project owner) as to ELECTRA (commercial representative) and to CCEE (Chamber of Commercialization of Electric Energy).

Table 3.8.1: Meters – ELO 2180SP – SHPP Engenheiro Ernesto Jorge Dreher

Characteristic	
Model	ELO 2180SP
Class	0.2
Function: - Main - Backup	Serial: - 90011045 - 90011046

Table 3.8.2: Meters – ELO 2180SP – SHPP Engenheiro Henrique Kotzian

Characteristic	
Model	ELO 2180SP
Class	0.2
Function: - Main - Backup	Serial: - 90011049 - 90011050

Table 3.8.3: Meters – ELO 2180SP – Substation of Salto do Jacuí Hydropower

Characteristic	
Model	ELO 2180SP
Class	0.2
Function: - Main - Backup	Serial: - 90011047 - 90011048

During the site visit, it was verified that all the above energy meters were properly installed, which ensures the continuous measurement of net electricity exported to the grid by the project activity.

Data monitoring, data management, training procedures, QA/QC procedures, calibrations, roles and responsibilities and maintenance procedures of monitoring equipment are clearly mentioned in the sections 3.2, 3.3 and 3.4 of the VCS PD.

Table 3.9.1: Responsibility for the Monitoring – SHPP Eng. Ernesto Jorge Dreher

Responsible	Area
BME Rincão do Ivaí Energia S.A.	registration monitoring measurement reporting
Coprel Cooperativa de Energia	Operations and Maintenance
Electra Comercializadora de Energia Ltda.	Commercial Representation and Accredited CCEE agent
CCEE	Electrical Energy Commerce Chamber Cross checking of the energy data is done against CCEE data base.

Table 3.9.2: Responsibility for the Monitoring – SHPP Eng. Henrique Kotzian

Responsible	Area
BME Capão da Convenção Energia S.A.	registration monitoring measurement reporting
Coprel Cooperativa de Energia	Operations and Maintenance
Electra Comercializadora de Energia Ltda.	Commercial Representation and Accredited CCEE agent
CCEE	Electrical Energy Commerce Chamber Cross checking of the energy data is done against CCEE data base.

Table 3.10: Monitored Parameters

Name	Unit	Description of measurement and monitoring methods
EG_{facilities,y} Quantity of net electricity generation supplied by the project plant/unit to	MWh/year	<u>Description of measurement methods and procedures to be applied:</u> the net electricity delivered to the grid will be checked through the electricity meters at Substation of Salto do Jacuí Hydropower, where the energy is delivered to the grid.

the grid in year y		<u>Monitoring frequency</u> : it will be continuously measured and recorded.
		<u>QA/QC procedures to be applied</u> : the data from the energy meters will be cross checked with the invoice of energy sales or with the CCEE databank.
EF_{grid,CM,y} Combined Margin CO2 emission factor for grid connected power generation in year y calculated	tCO ₂ e/MWh	<u>Description of measurement methods and procedures to be applied</u> : data provided by Brazilian DNA using the “Tool to calculate the emission factor for an electricity system”.
		<u>Monitoring frequency</u> : annually
		<u>QA/QC procedures to be applied</u> : DNA website
EF_{grid,OM-DD,y} CO ₂ Operating Margin emission factor of the grid, in a year y	tCO ₂ e/MWh	<u>Description of measurement methods and procedures to be applied</u> : data provided by Brazilian DNA using the “Tool to calculate the emission factor for an electricity system”.
		<u>Monitoring frequency</u> : annually
		<u>QA/QC procedures to be applied</u> : DNA website
EF_{grid,BM,y} CO2 Build Margin emission factor of the grid, in a year y	tCO ₂ e/MWh	<u>Description of measurement methods and procedures to be applied</u> : data provided by Brazilian DNA using the “Tool to calculate the emission factor for an electricity system”.
		<u>Monitoring frequency</u> : annually
		<u>QA/QC procedures to be applied</u> : DNA website
Cap_{PJ-JD} Installed capacity of the SHPP Engenheiro Ernesto Jorge Dreher after the implementation of the project activ-	W	<u>Description of measurement methods and procedures to be applied</u> : check of equipment plate and/or documentation
		<u>Monitoring frequency</u> : annually

ity		<u>QA/QC procedures to be applied:</u> Not applicable.
Cap_{PJ-HK} Installed capacity of the SHPP Engenheiro Henrique Kotzian after the implementation of the project activity	W	<u>Description of measurement methods and procedures to be applied:</u> check of equipment plate and/or documentation
		<u>Monitoring frequency:</u> annually
		<u>QA/QC procedures to be applied:</u> Not applicable.
A_{PJ-JD} Area of the reservoir measured in the water surface, after the implementation of SHPP Engenheiro Jorge Dreher, when the reservoir is full	m ²	<u>Description of measurement methods and procedures to be applied:</u> measured from topographical surveys, maps, satellite pictures, etc.
		<u>Monitoring frequency:</u> annually
		<u>QA/QC procedures to be applied:</u>
A_{PJ-HK} Area of the reservoir measured in the water surface, after the implementation of SHPP Engenheiro Henrique Kotzian, when the reservoir is full	m ²	<u>Description of measurement methods and procedures to be applied:</u> measured from topographical surveys, maps, satellite pictures, etc.
		<u>Monitoring frequency:</u> annually
		<u>QA/QC procedures to be applied:</u>
TEG_y Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y	MWh/y	<u>Description of measurement methods and procedures to be applied:</u> same as for EG.
		<u>Monitoring frequency:</u> continuous measurement and at least monthly recording
		<u>QA/QC procedures to be applied:</u>

Table 3.11: Fixed parameters

Name	Unit	Value	Description of measurement and monitoring methods
EF_{Res} Default emission	kgCO ₂ e/MWh	90	Decision by EB23

factor for emissions from reservoirs			
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Nevertheless, 02 CLs were raised. The list of the CLs is as follows.

Finding	CL 12		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please, include parameter 'TEG', as a monitored parameter, and 'EF _{Res} ', as a fixed parameter, according with the monitoring requirements of ACM0002.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The parameter "TEG" was included as monitored parameter (despite it is not currently monitored due to the fact of the power density to be greater than 10W/m ²) and the EF _{Res} was included as fixed parameter.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The parameter TEG was included as a monitored parameter and the parameter EF_{Res} was included as a fixed parameter in section 3.3 as per requirement of ACM0002. Nevertheless, please list separately the monitored parameters EG_{facility} and TEG for each SHPP. In addition, please list the fixed parameters from the tools (EF). <u>CL remains open</u>		
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The parameters EG facility and TEG were listed separately for each SHPP. The fixed parameters from the tool for calculation of the emission factor (NCV_{i,y}; EFCO₂; η_{m,y}) are not available to project proponents. They are considered by Brazilian DNA to calculate the emission factors (operating and build margins) of Brazilian electrical grid. The DNA annually discloses in its website the final values of grid emission factor to project proponents consultation. As there are no possibility to declare in the PD details about these parameters and it cannot be monitored by PPs, they were not included in PD.		
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The parameters EG_{facility} and TEG are now listed separately for each SHPP. The parameters EF_{grid,CM,y}, EF_{grid,BM,y} and EF_{grid,OM,y} are listed. The other parameters are used by the DNA which provides final results in its website. <u>CL is closed</u>		

Finding	CL 12
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding	CL 13
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section 3.4, please include a simplified wiring diagram indicating the delivery point, exact location of the meters and tension transformation.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	A simplified diagram was included in section 3.4.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	A simplified wiring diagram indicating that the delivery point is at Salto do Jacuí Hydropower Plant, where the meters are also located. The tension transformation (6.9kv to 138kv) was also included in section 3.4. Nevertheless, please clarify in section 3.2 and 3.4 how the monitoring of both SHPPs will be done in another hydraulic plant. <u>CL remains open</u>
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Clarifications about the monitoring/measurement system were provided in section 3.2. Also, minor changes were performed in figure 3 (section 3.4) to provide a easier understanding.
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	A full explanation about the monitoring of the plants is now given. It is clear that the monitoring of the plants is independent from any other plant and that the values are measured for each plant with a main and a backup meter. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.5 Calculation of GHG Emissions

As per the approved methodology ACM0002, baseline emission are calculated by multiplying net electricity exported by the project activity to the grid with combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”, provided by the Brazilian DNA.

As the project activity comprises two greenfield renewable energy power plants, the Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity in year y ($EG_{PJ,y}$) is equal to Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ($EG_{facility,y}$).

The calculations were checked by the validation team and deemed correct and presented in transparent manner.

As per the approved methodology ACM002, considering that both plants have power density above 10 W/m², there are no project emissions involved in the project there is no project emission from the project activity. The validation team checked this by conducting a document and calculation review.

The leakages are not considered as per the approved methodology.

Nevertheless, 01 CL was raised:

Finding	CL 14		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In excel spreadsheet 'VCUs_v1', the capacity used for calculation for SHPP Eng. Ernesto Jorge Dreher is given with 17.87MW instead of 17.95MW as mentioned in the PDD and as used in the investment calculation. Please clarify and if necessary, revise the calculations.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The value of 17,87 MW was used because it is the value of installed capacity authorized by ANEEL to be installed at the Engenheiro Ernesto Jorge Dreher power plant, according its dispatch 4,188, issued on 11 November 2009. To have a more realistic estimative of emission reductions, the number of 17,95 MW can be used despite it cannot be found currently in any documents as evidence (only are available the power capacity values related to 4 generator units already installed (UG1, 2, 3 and 4). The value of real installed capacity will be available to auditing after the implementation of the UG5, using the equipments technical specification plaques (as described in the PD). The value used in worksheet "VCUs_v1" was changed to 17,95 MW to have a more realistic estimative and the calculations were revised based on this new value.		

Finding	CL 14
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The used value for the calculations was changed to 17.95, which is a more accurate value. FAR A1 has already been raised to check the installed capacity during the subsequent verification. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.6 Environmental Impact

As small hydro power plants are considered to have low negative environmental impacts, just an Environmental Simplified Report (RAS) is necessary to the process of environmental licenses (Installation and Operation) issuance, according to the Brazilian legislation (Resolution 279 – CONAMA – the Brazilian National Environmental Council).

The validation team has reviewed the RAS for both SHPP Engenheiro Ernesto Jorge Dreher and SHPP Engenheiro Henrique Kotzian and checked environmental and social impacts raised and the proposed mitigation measures.

The Previous, Installation and Operation Licenses for both plants have also been presented confirming that the mitigation measures were in compliance with the regulatory requirements of FEPAM (the Environmental Agency of the State).

Nevertheless, the following CL was raised:

Finding	CL 15		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section 5, please briefly describe the main impacts identified in the RAS and the corresponding mitigation actions reflected in the respective environmental programs approved by FEPAM that are mentioned in the 4th paragraph, specially the reallocation of the families which households were displaced by the reservoir, as mentioned during the site visit.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The main negative impacts identified by the environmental studies were mentioned and also the mitigation actions adopted. The description requested about the reallocation was attempt as well.		

Finding	CL 15
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section 5 was completely revised and the main impacts identified in the RAS and the corresponding mitigation actions reflected in the respective environmental programs approved by FEPAM are now stated. <u>CL is closed</u>
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.7 Comments by stakeholders

A proper stakeholders consultation process have been performed by sending invitation letters (2011-01-26) describing the project activity and asking for comments. The below stakeholders have been invited:

- City Hall of Salto do Jacuí;
- City Hall of Júlio de Castilhos;
- City Council of Salto do Jacuí;
- City Council of Júlio de Castilhos;
- Secretary of Agriculture of Salto do Jacuí;
- Secretary of the Environment of Júlio de Castilhos;
- Trade, Culture and Industry Association of Júlio de Castilhos;
- Trade and Industry Association of Salto do Jacuí;
- FEPAM – Environmental Agency of the State of Rio Grande do Sul;
- FBOMS - Brazilian Forum of NGOs and Social Organizations;
- Prosecutors Office of the State of Rio Grande do Sul;
- Federal Prosecutors Office.

The only reply received was a congratulations letter from the Trade, Culture and Industry Association of Júlio de Castilhos.

4 Validation Conclusion

BME Rincão do Ivaí Energia S.A. and BME Capão da Convenção Energia S.A. have commissioned the TÜV NORD JI/CDM Certification Program to validate the project “Engenheiro Ernesto Jorge Dreher and Engenheiro Henrique Kotzian SHPs VCS Project (JUN1120)”, with regard to the relevant requirements for VCS project activities. The project reduces GHG emissions due to generation of electricity by exploiting the hydro energy potential.

In the course of the validation, 15 Clarification Requests (CL) were raised and successfully closed. One Forward Action Request (FAR) was raised and shall be assessed in the subsequent verification (first verification is being carried out along with validation). The validation is based on the project design document, emission reductions calculation sheet, supporting documents and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfillment of the stated criteria.

In detail the conclusions can be summarized as follows:

- the project is in line with all relevant host country criteria (Brazil) and all relevant VCS 2007.1 Standard criteria;
- the project additionality is sufficiently justified in the VCS PD;
- the monitoring plan is transparent and adequate;
- the calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 284,952 tCO₂e is most likely to be achieved within the 10 years (renewable) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Sao Paulo, 2011/06/20



Ricardo Lopes
TÜV NORD JI/CDM CP
Validation Team Leader

Essen, 2011/06/20



Eric Krupp
TÜV NORD JI/CDM CP
Final Approver

5 References

Table 5.1: Documents provided by the project proponent

Reference	Document
/CONST/	<u>Companies Constitution General Meeting:</u> - <i>SHPP Engenheiro Ernesto Jorge Dreher</i>: minute of the meeting – Constitution of Rincão do Ivaí Energia S. A. – 2006- 11-10 - <i>SHPP Engenheiro Henrique Kotzian</i>: minute of the meeting – Constitution of Capão da Convenção Energia S. A.– 2006- 11-17
/EIA/	<u>Environmental Simplified Report (RAS):</u> - <i>SHPP Engenheiro Ernesto Jorge Dreher</i>: Operation License for SHPP Engenheiro Ernesto Jorge Dreher – Geocenter Consultoria e Projetos – December/2008 - <i>SHPP Engenheiro Henrique Kotzian</i>: Operation License for SHPP Engenheiro Henrique Kotzian – Geocenter Consultoria e Projetos – June/2010
/FD/	- <i>SHPP Engenheiro Ernesto Jorge Dreher</i>: • Power Purchase Agreement #001/2007 between BME – Rincão do Ivaí Energia S. A. and Coprel Cooperativa de Energia – 2007-09-05 • Loan Contract between Rincão do Ivaí Energia S. A. and Caixa Econômica Federal (State Owned Federal Bank) #0215.684-14 – 2007- 12-19 • Table of Uses and Sources (QUF) – Rincão do Ivaí Energia S. A. – 2007- 12-19 • Commercial Representation contract between Rincão do Ivaí Energia S. A. and Electra Comercializadora de Energia Ltda. #033/2008 – 2009- 04-01 - <i>SHPP Engenheiro Henrique Kotzian</i>: • Power Purchase Agreement #001/2007 between BME – Capão da Convenção Energia S. A. and Coprel Cooperativa de Energia – 2007-09-05 • Loan Contract between Capão da Convenção Energia S. A. and Caixa Econômica Federal (State Owned Federal Bank) #0215.685-29 – 2007- 12-19 • Table of Uses and Sources (QUF) – Capão da Convenção Energia S. A. – 2007- 12-19 • Commercial Representation contract between Capão da Convenção Energia S. A. and Electra Comercializadora de

Reference	Document
	Energia Ltda. #032/2008 – 2009- 04-01 - <i>SHPP Engenheiro Ernesto Jorge Dreher and SHPP Engenheiro Henrique Kotzian:</i> • Lifetime and Depreciation Study – Federal Engineer School of Itajubá – November/2000 • Directives for Studies and Projects of Small Hydropower Plants – ELETROBRÁS (National Electric Utility Company) – January/2000 • Estimates of O&M – Consultant Benoni Hedlund – July/2007 • ANEEL's Resolutions and Authorizations (website links): ◦ list of assured energy ◦ Normative Resolution #77 – 2004-08-18 ◦ Authorizative Resolution #134 – 2005-04-11 ◦ Dispatch #2268 – 2005-12-29 ◦ Resolution #452 – 2007-04-19 • Brazilian Legislation: • Federal Decree 2410 – 1997-11-28 • Law #9718 – 1998-11-27 • Law 9427 – 2006-12-26 • Law #10637 – 2002-12-30 • Exchange rates – Central Bank of Brazil • MRE evidences: ◦ Operational Agreement between Rincão do Ivaí Energia S. A. and Capão da Convenção Energia S. A. with Company of Generation and Transmission of Electric Energy of the State of Rio Grande do Sul (CEEE – State Owned) – 2009-04-17 ◦ Proposal of Generation Relief System #201008100701-106 between Belo Monte Energia (BME) and Sul Engenharia e Sistemas Ltda. – August/2010 ◦ Contract of Generation Relief System between Rincão do Ivaí Energia S. A. and Capão da Convenção Energia S. A. with Sul Engenharia e Sistemas Ltda. – 2010-10-20 • ANEEL's Resolutions/Dispatches: ◦ Dispatch #2268 – 2005-12-29 ◦ Resolution #452 – 2007-04-18 • Letter reporting the expenses of the financial operations of SHPP Dreher and SHPP Kotzian – Caixa Econômica Federal (CEF) – 2011-04-06

Reference	Document
	- Letter about the financial feasibility of the project activity from Mr. Benoni Hedlund (SHPP specialist hired to perform the financial analysis) – 2011-04-11 - Selic rate calculations and evolution graphs
/LIC/	<u>Licenses:</u> - <i>SHPP Engenheiro Ernesto Jorge Dreher:</i> - Previous License: #108/2004 – FEPAM – 2004-01-30 - Installation License: #372/2008 – FEPAM – 2008-04-22 - Operation License: #2968/2009 – FEPAM – 2009-06-18 - <i>SHPP Engenheiro Henrique Kotzian:</i> - Previous License: #455/2005 – FEPAM – 2005-06-24 - Installation License: #495/2010 – FEPAM – 2010-05-07 - Operation License: #1122/2011– FEPAM – 2011-03-02

Reference	Document
/TD/	<u>Technical Data and Operational Procedures:</u> - <i>SHPP Engenheiro Ernesto Jorge Dreher:</i> • Data Book – Synchronous Generator SPD 900 – WEG – November/ 2008 • Data Book – Turbines – HISA – December/2009 • 1st Electric Project Manual – Automatronic – May/2010 • HGF 450 (Generator UG5) – #143842/2010 – 2010-12-07 • Manual of Internal Contingencies – SHPP Jorge Dreher – Coprel Energia – December/2010 • Work Instruction – Accounting Emission Reductions – Coprel Energia – December/2010 • Operations Manual – SHPP Ernesto Jorge Dreher – rev. 0 – BME Rincão do Ivaí Energia S. A. – 2011-03-25 • Operations Manual of the Powerhouse – SHPP Dreher – rev. 0 – BME Rincão do Ivaí Energia S. A. – 2011-03-25 - <i>SHPP Engenheiro Henrique Kotzian:</i> • Data Book – Synchronous Generator SPD 900 – WEG – September/ 2008 • Manual of Internal Contingencies – SHPP Henrique Kotzian – Coprel Energia – December/2010 • Work Instruction – Accounting Emission Reductions – Coprel Energia – December/2010 • Operations Manual – SHPP Henrique Kotzian – rev. 0 – BME Rincão do Ivaí Energia S. A. – 2011-03-25 • Operations Manual of the Powerhouse – SHPP Kotzian – rev. 0 – BME Rincão do Ivaí Energia S. A. – 2011-03-25
/PD/	VCS PD “Engenheiro Ernesto Jorge Dreher and Engenheiro Henrique Kotzian SHPs VCS Project (JUN1120)” – version 3
/SHC/	<u>Stakeholder consultation process evidences:</u> - Invitation letters - Confirmations of Receipt - Letter from Trade, Culture and Industry Association of Júlio de Castilhos – 2011-02-02
/SUPP/	<u>Supplier’s Contracts:</u> - <i>SHPP Engenheiro Ernesto Jorge Dreher:</i> • Turbines: between Rincão do Ivaí Energia S. A. and Bee

Reference	Document
	Indústria e Comércio de Equipamentos Ltda. – 2007- 12-04 • Turbines: between Rincão do Ivaí Energia S. A. and Hidráulica Industrial S. A. Indústria e Comércio - HISA – 2007- 12-06 • Generators: between Rincão do Ivaí Energia S. A. and WEG Equipamentos Elétricos S. A. – 2007- 12-13 • Generators: between Rincão do Ivaí Energia S. A. and Equacional Elétrica e Mecânica Ltda. – 2007 - <i>SHPP Engenheiro Henrique Kotzian</i>: contract between Capão da Convenção Energia S. A. and Electra Comercializadora de Energia Ltda. #032/2008 – 2009- 04-01 • Turbines: between Capão da Convenção Energia S. A. and Hidráulica Industrial S. A. Indústria e Comércio - HISA – 2007- 12-06 • Generators: between Capão da Convenção Energia S. A. and WEG Equipamentos Elétricos S. A. – 2007- 12-13
/XLS/	Excel spreadsheet calculations

Table 5.2: Background investigation and assessment documents

Reference	Document
/ACM0002/	Consolidated baseline methodology for grid-connected electricity generation from renewable sources - version 12.1.0 – from September 17 th , 2010 onwards)
/CONAMA 279/	Resolution CONAMA 279 (2001) – Environmental National Council
/IPCC-GP/	IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000
/IPCC/	2006 IPCC Guidelines for National Greenhouse Gas Inventories: General Guidance and Reporting
/KP/	Kyoto Protocol (1997)
/TOOL/	- Tool to calculate the emission factor for an electricity system - version 2 - Tool for the demonstration and assessment of additionality - ver-

Reference	Document
	sion 5.2
/VCS/	Voluntary Carbon Standard Program Guideline 2007.1.
/VVM/	CDM Validation and verification Manual – version 1.2

Table 5.3: Websites used

Reference	Link	Organization
/aneel/	www.aneel.gov.br	Electric Energy National Agency
/bcb/	www.bcb.gov.br	Central Bank of Brazil
/ccee/	www.ccee.org.br/	Electrical Energy Commerce Chamber Cross checking of the energy data is done against CCEE data base.
/ceee/	www.ceee.com.br/pportal/ceee/Component/Controller.aspx	Company of Generation and Transmission of Electric Energy of the State of Rio Grande do Sul (CEEE – State Owned)
/cef/	www.caixa.gov.br/	Caixa Econômica Federal (State Owned Federal Bank)
/fepam/	www.fepam.rs.gov.br	Environmental Agency of the State of Rio Grande do Sul
/mct/	www.mct.gov.br	Brazilian Ministry of Technology and Science – <i>Ministério da Ciência e Tecnologia</i>
/unfccc/	http://cdm.unfccc.int	UNFCCC
/vcs/	www.v-c-s.org	VCS website

Table 5.4: List of interviewed persons

Reference	Mol ¹		Name	Organization / Function
/IM01/	V	☒ Mr. ☐ Ms	Antonio J. Mauro de Rezende	BME / Director

Reference	Mol ¹		Name	Organization / Function
/IM01/	V	☒ Mr. ☐ Ms	Eliseu V. de Lima	BME / Administrative Assistant
/IM01/	V	☒ Mr. ☐ Ms	Ivan Bittencourt	BME / Operator of SHPP Jorge Dreher
/IM01/	V	☒ Mr. ☐ Ms	João Carlos Fiuza	BME / Operator of SHPP Henrique Kotzian
/IM01/	V	☒ Mr. ☐ Ms	Telmo de Souza	BME / Operator of SHPP Henrique Kotzian
/IM02/	V	☒ Mr. ☐ Ms	Leandro Mazola	Coprel / Engineer
/IM03/	V	☒ Mr. ☐ Ms	Arthur A. C. Moraes	Carbotrader / Director
/IM03/	V	☐ Mr. ☒ Ms.	Diego de Noronha Assini	Carbotrader / Project Manager

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)