FINAL VALIDATION REPORT

DESENVIX S.A.
ENERBIO CONSULTORIA LTDA

CDM PROJECT OF MOINHO AND BARRACÃO SMALL HYDROPOWER PLANT

Report No: 5630/08 - 08/133

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Approved by: Mr. E. Krupp	Organisational unit: TÜV NORD JI/CDM Certification Program
Client: Desenvix S.A. / Enerbio Consultoria Ltda	Client ref.: Mr. Marcelo Loureiro / Mr. Eduardo Baltar

Summary/Opinion:

The Desenvix S.A. and Enerbio Consultoria Ltda have commissioned the TÜV NORD JI/CDM Certification Program to validate the project: *"CDM project of Moinho and Barracão small hydropower project"* with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords), and the relevant decisions by COP/MOP and CDM Executive Board.

The project activity consists of the supply of clean hydroelectric energy to the Brazilian National Interconnected System through the implementation and operation of Small Hydropower Plants (run-of-river) Moinho and Barracão with an installed capacity of 25.7 MW. A risk-based approach has been followed to perform this validation. In the course of the draft validation 4 Corrective Action Requests (CARs) and 8 Clarification Requests (CRs) were raised and successfully closed.

The review of the project design documentation 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 fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Brazil) and all relevant UNFCCC requirements for CDM. At the time of the completion of the validation the LoA is pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA could not be considered at the present validation stage.
- The project additionality is sufficiently justified in the PDD.
- 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 107,909 t CO_{2e} is most likely to be achieved within the 7 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.

Report No.: 5630/08 – 08/133	Subject Group: Environment	
Report title: CDM project of Moinho and Barracão small hydropower project		
Work carried out by: Rainer Winter Maria Carolina Crisci Coelho Inga Nagel		
Work verified by: Eric Krupp		
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Indexing terms

Climate change
CDM
Validation
Kyoto Protocol

Abbreviations

BAU	Business as usual
CA	Corrective/Clarification Action
CAR	Corrective Action Request
CCEE	Chamber of Commercialization of Electrical Energy
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CP	Certification Program
CR	Clarification Request
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
kW	Kilowatt
kWh	Kilowatt hour
LoA	Letter of Approval
MCT	Ministry of Science and Technology
MP	Monitoring Plan
MW	Megawatt
NOS	National Operator System
PDD	Project Design Document
QA/QC	Quality control/Quality assurance
SHP	Small Hydro Power Plant
UNFCCC	United Nations Framework Convention on Climate Change

Table of Contents *Page*

1 INTRODUCTION

Desenvix S.A. and Enerbio Consultoria Ltda have commissioned TÜV NORD JI/CDM Certification Program (CP) to validate the project:

"CDM project of Moinho and Barracão small hydropower project"

with regard to the relevant requirements for CDM project activities.

1.1 Objective

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

- the requirements of Article 12 of the Kyoto Protocol/KP/; the CDM modalities and procedures as agreed in the Marrakech Accords under decision 17/CP.7/MA/; the annex to the decision; subsequent decisions made by COP/MOP & CDM Executive Board,
- other relevant rules, including the host country (Brazil) legislation and sustainability criteria

are validated in order to confirm that the project design as documented is sound and reasonable 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 certified emission reductions (CERs).

1.2 Scope

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 ACM 0002, version 07: "Consolidated methodology for grid-connected electricity generation from renewable sources"), which are included in the PDD and other relevant supporting documents.

The items covered in the validation are described below:

- **UNFCCC & Host Country Criteria**
  - UNFCCC/Kyoto Protocol requirements, in particular, the requirements of the CDM as set out in decision 17/CP.7 (Marrakech Accords), the present annex, and relevant decisions by COP/MOP & CDM Executive Board
  - Host country requirements / criteria

- **CDM Project Description**
  - Project design
  - Project boundaries
  - Estimated CDM 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**
  - Publishing the PDD on TUV NORD website
  - Review of comments

- **Draft validation reporting with CARs & CRs, if any**

- **Final validation reporting.**

The information included in the PDD 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 CERs. The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions. TÜV NORD JI/CDM CP can not be held liable by any entities for making its validation opinion based on any false or misleading information supplied to it during the course of validation.

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

1.3 GHG Project Description

1.3.1 Project Scope

The considered GHG project can be classified as a large scale CDM project in the sector given in Table 1-1 (according to List of Sectoral Scopes of UNFCCC).

Table 1-1: Project Scope

No.	Project Scope
1	Energy industries (renewable / non-renewable sources)

1.3.2 Project Parties

Brazil is the party involved in the project activity.

1.3.3 Project Entities

The following entities are involved in the developing of the project:

Project Proponent: **(Host country)**	Desenvix S.A. Rio Branco Avenue, 691 – 10º. Floor – Executive Center Atlantis Florianópolis – Santa Catarina - 88015-203 Brazil
Contact Person:	Mr. Marcelo Loureiro +55 (48) 21070580 / +55 (48) 30243372 marcelo.loureiro@desenvix.com.br
Project Proponent: **(Host country)**	Enerbio Consultoria Ltda Carlos Gomes Avenue, 281 – Business Centre Eugenio Gudin Porto Alegre – Rio Grande so Sul – 90480-003 Brazil
Contact Person:	Mr. Eduardo Baltar +55 (51) 33921504 / +55 (51) 33921505 eduardo@enerbio-rs.com.br

1.3.4 Project location

The project activity is located in Barracão and Pinhal da Serra municipalities, in Rio Grande do Sul state, in the south part of Brazil. The details of the project location are given in table 1-2:

Table 1-2: Project Location

No.	Project Scope	
Host Country	Brazil	
SHP	Moinho	Barracão
Rivers:	Bernando José	
Latitude:	27°45'42'' S	27°47'53'' S
Longitude:	51°19'52'' W	51°21'32'' W

1.3.5 Project technical description

The project activity consists of the supply of clean hydroelectric energy to the Brazilian National Interconnected System through the implementation and operation of Small Hydropower Plants (run-of-river) Moinho and Barracão with an installed capacity of 25.7 MW.

The basic technical data of the project activity is given in the following table 1-3.

Table 1-3: Technical data of project activity (according to PDD version 1)

The equipments

Technical Characteristics	SHP Moinho	SHP Barracão
Installed capacity (MW)	13.7	12
Reservoir Area (km^2)	0.317	2.87
Medium Energy (MW)	7.84	6.40
Firm Energy (MW)	7.30	6
Turbines		
Quantity	2	2
Type	Francis	Francis
Nominal Capacity (kW)	7,100	6,190
Maximum Perfomance	92%	91.1%
Generators		
Unit Nominal Capacity (kVA)	7,620	6,660
Power Factor	0.9	0.9
Dam		
Type	Gravity/RCC	RCC
Maximum Height (meters)	33.3	33.3
Power House		
Type	Sheltered	Sheltered

2 VALIDATION TEAM

- The Validation Team is led by Mr. **Rainer Winter**. He works at TÜV NORD as ISO 9001/ 14001 Auditor and environmental verifier for EMAS. He is also an approved emission verifier within the European Emission Trading Scheme. Mr. Winter is an authorized JI/CDM assessor and is global leader of the TÜV NORD JI/CDM CP. For this validation he was assisted by:
- **Maria Carolina Crisci Coelho**, BRTÜV (TÜV NORD Brazil), Ms. Coelho is an ISO 14001 Auditor and Product Manager for CDM Services for BRTÜV. She is an appointed expert for the TÜV NORD JI/CDM certification program.
- **Inga Nagel,** Environmental Scientist and presently with TÜV NORD CERT GmbH. She is a TÜV NORD Cert auditor for ISO 9001 and ISO 14001. She has received extensive training in CDM validation and verification process and is an appointed expert for the JI/CDM CP of TÜV NORD.
- **Ricardo Ribeiro Lopes** and **Fernando Pasquali Pacheco**, BRTÜV (TÜV NORD Brazil), Trainees.

The validation report is verified by:

- Mr. **Eric Krupp**. He is an expert in the field of environmental approval procedures as well as national and international Emission Trading. He works at TÜV NORD as an approved emission verifier within the European Emission Trading Scheme. Mr. Krupp is an authorized JI/CDM assessor and deputy head of the JI/CDM Certification Program of TÜV NORD.

3 METHODOLOGY

The validation of the project was carried out from June 2008 to September 2008. It was divided into two phases: the pre-validation and the final validation phase. The pre- validation consisted of the following three phases:

- A desk review of the PDD (incl. annexes) and supporting documents with the use of a customised validation protocol /CPM/ according to the Validation and Verification Manual /VVM/;
- Back ground investigation and follow-up interviews with personnel of the project proponent, the project developer, legal authorities and other stakeholders;
- Reporting of draft validation findings taking into account the public comments received on TUV NORD website.

The draft validation report includes Corrective Action Requests and Clarification Requests (CAR and CR) 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.

The final validation started after issuance of proposed corrective action (CA) of these CAR and CR by the project proponent. The validator has assessed the proposed CA with a positive result and after the closure of these CAR and CR the project proponent has issued the final version of the PDD. On the basis of this the final validation report and opinion were issued.

3.1 Validation Protocol

In order to ensure consideration of all relevant assessment criteria, a validation protocol was used. The protocol shows, in a transparent manner, criteria and requirements, means of verification and the results from pre-validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements that a CDM project is expected to meet;
- It ensures a transparent validation process where the independent entity will document how a particular requirement has been validated and the result of the determination.

The validation protocol consists of three tables: Table 1 (Mandatory Requirements); Table 2 (Requirement Checklist); and Table 3 (Resolution of Corrective Action and Clarification Request) as described in Figure 1.

The completed draft validation protocol is enclosed in Annex I to this report identifying 04 Corrective Action Requests and 08 Clarification Requests.

Validation Protocol Table 1: Mandatory Requirements		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.*

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in five different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation conclusion***
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the Client or other project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1: Validation protocol tables

3.2 Review of Documents

The draft PDD[/PDD/] submitted by Desenvix S.A. and Enerbio Consultoria Ltda in May 2008 and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports 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 7 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 7-1)
- Background investigation and assessment documents (Table 7-2)
- Websites used (Table 7-3).

In order to ensure the transparency of the decision making process, the reference codes listed in tables 7-1 to 7-3 are used in the validation protocol and – as far applicable – in the report itself.

3.3 Site Visit and Follow-up Interviews

On 18th June 2008 the TÜV NORD JI/CDM CP performed on-site interviews with the project proponents, project developer and local stakeholders to confirm selected information and to resolve issues identified in the document review.

The key interviewees and main topics of the interviews are summarised in Table 3-1.

Table 3-1 Interviewed persons and interview topics:

Interviewed Persons / Entities	Interview topics
Project developer, proponent representative and local stakeholder	- Environmental Policy - General aspects of the project - Technical details of the project realisation - Approval procedures and status - Quality Management System - Involved personnel and responsibilities - Training of personnel - Monitoring and measurement equipment - Financial aspects - Baseline study assumptions - Environmental impacts - Details of emission reduction calculation - Operational data

Interviewed Persons / Entities	Interview topics
	- Crediting period - Project activity starting date. - CER allocation /ownership - Sustainable development issues - Power Generation & Metering system - Analysis of local stake holder consultation process - Roles & responsibilities of the staff members w.r.t project management, monitoring and reporting - QC testing and calibration procedures and facility

A detailed list including the functions or designations of the interviewed persons is given in chapter 7 (see Table 7-4). This table also includes reference codes to be used in the validation protocol.

3.4 Resolution of Clarification and Corrective Action Requests

In order to remedy any mistakes, problems or any other outstanding issues which needed to be clarified for positive conclusion on the project design, CARs and CRs were raised.

In this validation report 04 CARs and 08 CRs are raised.

The CARs / CRs are documented in the Annex and addressed in section 4.

3.5 Public Stakeholder Comments

The PDD was made publicly available through TÜV NORD JI/CDM CP website www.global-warming.de. Comments on the PDD were invited from 2008/05/27 to 2008/06/26.

No comments were received. In case comments would have been received they would have also been made publicly available on this web site.

3.6 Finalising the report

The draft validation report containing a set of CARs & CRs was submitted to the project proponent. The project design document was revised addressing the CARs & CRs issued by TÜV NORD JI/CDM CP. After reviewing the revised and resubmitted project documentation[/PDD/]; resolving the CRs & CARs raised and outstanding concerns, TÜV NORD JI/CDM CP issues this final validation report and opinion.

4 PRE-VALIDATION FINDINGS

In the following paragraphs the findings from the desk review of the draft PDD[/PDD1/], visits, interviews and supporting documents are summarised. This also includes the corresponding corrective action taken by the client and its final assessment.

The results are shown in table 4-1:

Table 4-1: Summary of CAR and CR issued

Validation topic [1)]	No. of CAR	No. of CR
General description of project activity (A) *(4.1)* - Project boundaries *(4.1.1)* - Participation requirements *(4.1.2)* - Technology to be employed *(4.1.3)* - Contribution to sustainable development *(4.1.4)* - General topics *(4.1.5)*	0	2
Project baseline and monitoring methodology (B) *(4.2)* - Baseline Methodology *(4.2.1)* - Baseline scenario determination *(4.2.2)* - Additionality determination *(4.2.3)* - Calculation of GHG emission reductions *(4.2.4)* Project emissions Baseline emissions Leakage Emission reductions - Monitoring Methodology *(4.2.5)* - Monitoring of *(4.2.6)* Project emissions Baseline emissions Leakage Sustainable development indicators / Environmental impacts - Project management planning *(4.2.7)*	3	5
Duration of the Project / Crediting Period (C) *(4.3)*	1	0
Environmental impacts (D) *(4.4)*	0	1
Stakeholder Comments (E) *(4.5)*	0	0
SUM	4	8

[1)] The letters in brackets (A-E) refer to the validation protocol

For an in depth evaluation of all validation items it should be referred to the validation protocol (Annex). Annex also includes all CARs and CR (Tables 2 and 3).

4.1 General Description of the Project Activity

4.1.1 Project Boundaries

The project´s spatial and system boundaries are clearly defined in the project documentation. The project encompasses the project power plant (Small Hydropower Plant Moinho and Barracão) and all physically connected power plants of the Brazilian National Interconnected System. The boundary definition is in line with the applied methodology.

Nevertheless a clarification regarding the project coordinates was requested.

Clarification Request A1:	
CR	In section A.4.1.4 the exact coordinates (including seconds) for SHP Barracão shall be provided.
CA:	The exact coordinates (including seconds) for SHP Barracão were provided in section A.4.1.4.
Conclusion:	OK, data is provided. CR is resolved.

4.1.2 Participation Requirements

Brazil as a non Annex I-party meets all relevant participation requirements. At the time of the completion of the validation the LoA is pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA could not be considered at the present validation stage.

4.1.3 Technology to be employed.

The SHPs Moinho and Barracão will use small capacity reservoirs to produce electric energy with a total installed capacity of 25.7 MW. All the equipments and technologies to be employed in the project activity are already being produced in the host country and successfully applied in similar projects worldwide.

In order to ensure that the plant is working as designed the manufacturers will provide specific training to the operational staff.

The frequency of the calibration of monitoring equipments is defined by NOS (National Operator of the Electric System) as a two years periodic period.

4.1.4 Contribution to Sustainable Development

The project is in line with current sustainable development priorities in Brazil.

Nevertheless the Brazilian DNA will finally decide whether the project is in line with the sustainable development policies - considering the results of this validation report.

The project participant acquires to contribute with the sustainable development through the following actions: clean and renewable electricity generation, direct and indirect job generation due to the project activity, technology improvement in the local area of the project activity and the project participant commitment for the investment in environmental programs and actions. More detailed information can be found in the section A.2 of the PDD.

Mainly due to these presented topics above the validation team is convinced that the project contributes to sustainable development. Nevertheless the Brazilian DNA has not confirmed the sustainable development contribution yet, which will be addressed in the LoA.

4.1.5 General Topics

In general the PDD has been duly filled. Nevertheless some mistakes had to be corrected and not all information could have been made available to the validation team at the stage of the draft validation. Thus corresponding Clarification Request had to be raised.

Clarification Request A2:	
CR	The following editorial corrections are required: - In section B.8 the date of completion is not in the correct format. - In section C.1.2 and C.2.1.2 the operation lifetime of the project activity and the length of the crediting period respectively shall be stated in years and months. - The PDD includes in several sections of the PDD Portuguese parts of a sentence (e.g. B.5, B.6.1, B.6.2, 7.1, 7.2). - Explain all abbreviations used in the PDD (e.g. B.5).
CA:	• In section B.8 the date of completion was corrected; • In section C.1.2 and C.2.1.2 the operation lifetime of the project activity and the length of the crediting period were stated in years and months. • Portuguese parts of some sentence were translated to English. • All abbreviations were explained.
Conclusion:	OK, all appointed issues were corrected and all information necessary are now available. CR is closed.

4.2 Application of Baseline and Monitoring Methodology

4.2.1 Baseline Methodology

The applied baseline methodology is the approved baseline methodology ACM0002 (Version 7) entitled “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

The applicability criteria as stated in ACM0002 are fulfilled:

- The project activity is the installation of two SHPs with new reservoirs and a power density of more than 4 W/m².

- The geographic and suited boundary system are unique clearly identified
- All relevant information regarding the grid characterization was made available during the validation process

Despite of the project compliance with the baseline methodology, during the draft validation one clarification request was opened as follows.

Clarification Request B1:	
CR	In section B.1 all tools the methodology draws upon and their version shall be indicated.
CA:	All tool and methodologies (and their versions) used were indicated.
Conclusion:	OK, information was included in the PDD. CR is closed.

4.2.2 Baseline Scenario Determination

The baseline scenario has been determined according to the methodology applied. The baseline scenario is the electricity delivered to the grid by the project activity that would have otherwise occurred by electricity generation using fossil fuel sources.

As per Brazilian Designated National Authority (DNA) request/dna-ef/, the National Interconnected System must be considered as a unique System. Emission factors calculated for the single system have been made available on the MCT website[1]. The calculation follows the methodological tool "Tool to calculate the emission factor for an electricity system" approved by the CDM Executive Board.

In the first version of the ER calculation, the CO_2 factor used to calculate the GHG emission reduction was not based on the same definition. Therefore CAR B1 was raised and could be closed after the project participant has provided all the necessary changes in the PDD/PDD/ and ER calculation sheet/XCS/.

Corrective Action Request B1:	
CAR	CO_2 emission factors of South Subsystem published by Brazilian DNA have been applied. However, Brazilian DNA has decided to adopt the configuration of a single electricity system in Brazil and revised grid emission factor calculation accordingly. Revision of the emission reduction calculation considering current available data is required and relevant sections in the PDD shall be adapted. Calculation of CO_2 emission factors shall be provided to DOE.
CA:	Emission Reduction calculation was corrected considering the decision of Brazilian DNA. New Emission Reduction Calculation and New Emission Factor will be provided to DOE. The calculation of CO2 emission factors were provided by Brazilian DNA. Spreadsheet with data made available by Brazilian DNA was sent to DOE and the link where this information is available is described in the PDD.
Conclusion:	OK. All relevant sections were corrected according to the new emission factor used. CAR closed.

[1] http://www.mct.gov.br/index.php/content/view/13986.html

4.2.3 Additionality Determination

As per ACM0002 the additionality of the project has to be demonstrated using the latest version of the "Tool for demonstration and assessment of additionality". Therefore the version 05.2 was applied. During the draft validation the presented CAR was found and could be resolved.

Corrective Action Request B2:	
CAR	The investment analysis is available for SHP Moinho only and in parts not traceable. Revision is required as follows: - The investment analysis of SHP Barracão shall be provided. - WACC is an appropriate benchmark for project IRR. However, in the investment analysis equity IRR was used for comparison. Adequate benchmark shall be applied. - A list of all parameters considered in the investment analysis (IRR and WACC calculation) including value, unit, description, rationale of assumption and source shall be provided. All abbreviations shall be explained. - Clarification is required why taxes on gross revenue have been calculated without considering the operational costs. - Clarification is also required whether personnel costs have been considered in the investment analysis. - The calculations of the parameters shall be explained more detailed. This applies especially to all calculations related to the funding of the project (e.g. Funding deflation index, Total depreciation). All data sheets the calculation refers to, shall be provided. - The spreadsheets of WACC calculation and sensitivity analysis shall be provided. - Clarification is required why "Commercialized Energy" is used for IRR calculation but "firm energy" to calculate ER. - Information within the tables shall be in English only. According to the Guidelines for completing the PDD information used to determine additionality shall not be considered confidential. In case where project participant does not wish to make the spreadsheet submitted to the DOE available to the public an exact read-only or PDF shall be provided in addition for general publication.
CA:	• The investment analysis of SHP Barracão was provided. It is the same spreadsheet of SHP Moinho. To check information about SHP Barracão investment analysis is necessary to select the option of SHP Barracão on Cell D4. • WACC and Project IRR were applied. • All parameters considered in investment analysis were described and all abbreviations explained. • SHP Moinho and Barracão will be taxed on Brazilian Tax System called "Presumed Profit" (from the Portuguese: Lucro Presumido". These projects can apply this Tax System because they have less annual revenue than R$ 48 Million, as indicated by Brazilian Laws. This Tax System applies taxes on Gross Revenues and not on Profits. Project Participants follows Brazilian Laws to calculate Taxes. All Laws that

	support these assumptions are described on PDD. • Personnel costs are included in O&M (Operation and Maintenance) Costs. Therefore, they were considered in the investment analysis. • Investment Analysis was corrected and all parameters and calculations (mainly, related to the funding of the project) were described more detailed. • Spreadsheets of WACC calculation and sensitivity analysis were sent to DOE. • Emission Reduction was calculated again with "Commercialized Energy".
Conclusion:	The provided data was enough to finalise the assessment of the investment analyses. CAR is closed.

The arguments to justify the additionality were summarised in table 4-2. This table also includes the assessment of the validation team.

Table 4-2: Additionality assessment

Step[1)]	Argument PP	Assessment of the validation team	
1	Three alternative scenarios to the project activity were identified. All of them, including the project activity, fulfil the requirements of the local and national applicable laws.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not decisive ☒ Argument justified / significant	☒ step passed ☐ step not passed ☐ not applicable
2	As the project generates financial and economic benefits, other than CERs incomes, the benchmark analysis was applied. The project IRR was identified as financial indicator and the Weighted Average Cost of Capital (WACC) was considered as benchmark. The benchmark analysis showed that the financial indicators of the SHPs are less favourable than the benchmark. Three majors' variables that might affect the finance of the proposed project were identified and included in the sensitivity analysis. The scenarios show that in all cases the projects IRRs are lower than the WACC. The project activity is not attractive in the financial point of view.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not decisive ☒ Argument justified / significant	☒ step passed ☐ step not passed ☐ not applicable

Step[1)]	Argument PP	Assessment of the validation team	
3	This step was not applied.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not decisive ☐ Argument justified / significant	☐ step passed ☐ step not passed ☒ not applicable
4	There are other SHP projects activities in Brazil, although this is not the common practice found in the Brazilian market as information provided in the PDD.	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not decisive ☒ Argument justified / significant	☒ step passed ☐ step not passed ☐ not applicable
Assessment of the validation team		☒ **project is additional** ☐ **project is not additional**	

1) acc. to Additionality Tool (ver. 5.02)

The additionality justification for this project can be summarized as follows:

- the project activity is in compliance with all national and local laws
- the project IRR is a suitable financial indicator of the proposed project activity. It has been calculated based on project cash outflows and cash inflows, irrespective the source of financing. Basic technical design data considered within the calculation of the financial indicator deemed to be appropriate evidenced through commercial offer and manufactures technical specification.
- Financial assessment of the project activity was carried out in supporting spreadsheets/IA/ The input data and basic financial assumptions (hours of operation, electricity generation, Tariff rate, CER revenue, O&M expenses, insurance charges, income tax, benchmark) for calculation of IRR are cross verified with the documental evidences provided by the PP and are found to be satisfactory.
- the WACC is considered as an appropriate benchmark value because both, project IRR and WACC represent a return on investment demanded by investors and creditors. WACC does not represent company internal benchmark but the standard return in the Brazilian market based on standard cost of debt and return on equity based on the Brazilian selic rate, beta coefficients of electricity generation companies in emerging market and the equity Investment Fund Infra Brazil of the years 2002-2007. The applied sources are considered adequate to calculate WACC.
- Both financial indicator (Project IRR) and the benchmark (WACC) are calculated on a post tax basis. For this reason financial indicator and benchmark are considered to be consistent in this matter.

- the project activity generates income (except from CDM credits), but the benchmark analysis provided sufficient information to proof that the project is not financial attractive and
- although there are other SHP projects activities in Brazil, sufficient evidences have been provided to show that this is not the common practice found in the Brazilian market.

Therefore the project is unequivocally additional.

4.2.4 Calculation of GHG Emission Reductions

Acc. to the final PDD the project is expected to reduce emissions of **107,909 tCO_{2e}** over the 7 years crediting period.

The emission reductions (ER_y) of the project activity during the crediting period are the difference between the baseline emissions (BE_y), project emissions (PEy) and leakage (LE_y).

Baseline emissions are calculated by multiplying the grid emission factor ($EF_{grid,CM}$) for the Brazilian National Interconnected System and the net electricity exported to the grid. The grid emission factor will be determined ex-post and estimated as combined margin emission factor, consisting of the dispatch data analysis operating margin (EF_{OM}) factor and the build margin (EF_{BM}) factor. The weight factors of w_{OM} = w_{BM} = 0.5 will be used. The calculation is based on data published by Brazilian DNA (cp. 4.2.2). For the ex-ante estimation of emission reductions the grid emission factor based on data of the year 2007 has been applied.

In order to have proper access to the data used for the EF_{BM} and EF_{OM} calculation, the DOE/AIE Forum requested the Brazilian DNA for an opportunity to assess that the "tool to calculate the emission factor for an electricity system" was correctly applied in calculating the grid emission factor at your offices, observing your specific requirements, including confidentiality and non-removal of data from your offices[/DFL/].

Trough a meeting realized on 2009/02/05, in Brasília, the Brazilian DNA granted to one representative of the DOE/AEI Forum and one representative of each DOE the opportunity to assess the correct application of the tool[/DNAOF/]. One representative of TÜV NORD CERT GmbH JI/CDM Certification Program attends to this meeting. Sufficient evidence could be provided that the "tool to calculate the emission factor for an electricity system" is correctly applied by the Brazilian DNA for the EF_{BM} and EF_{OM} identification. Thus the identified EF_{gridCM} is properly calculated.

The electricity generation considered for the ex-ante calculation of the baseline emissions is the firm energy generation minus the connection losses/internal consumption and transmission losses (2 percent of the firm energy generation respectively). The firm energy has been deduced from historical river flow data. Related data have been checked during the on-site visit. All assumptions applied for the baseline scenario are considered reasonable and conservative, as it could be checked during the validation process.

As the power density of SHP Barracão is between 4 – 10 W/m², project emissions are calculated according to ACM0002 (version 7) by multiplying the total electricity produced by this SHP and the default emission factor for emissions from reservoirs.

For the ex-ante estimation of emission reductions the firm energy has been considered as total electricity to calculate PE.

Potential leakage emissions for the proposed project activity are the power plant construction, fuel handling and land inundation. According to ACM0002 methodology these leakage emissions sources do not need to be considered. Therefore the leakage emission for the project activity is zero.

The validation team is convinced that the calculation of the GHG emission reductions is carried out in line with the applied methodology in a complete and transparent manner. In case assumptions were necessary to calculate the emission reductions these assumptions can be assessed as conservative. All values are well referenced.

Uncertainties are sufficiently addressed in the final PDD.

Nevertheless in the course of the pre-validation several CAR/CRs have been raised. All raised issues could finally be resolved. Please refer to the list below.

Corrective Action Request B3:	
CAR	During the visit, it was informed that the projected dimension of SHP Moinho reservoir was changed, so correction on calculation is necessary.
CA:	The dimension of SHP reservoir was changed. Necessary corrections were made.
Conclusion:	OK, the PDD was revised accordingly. CAR is closed.

Clarification Request B2:	
CR	The parameters “Medium Energy” and “Firm Energy” shall be defined and deduction of values explained. Moreover clarification is required why only 360 days and not 365 days has been considered in the calculation of BE and PE.
CA:	Parameters “Medium Energy” and “Firm Energy” were defined on item A.4.3. In the first version of the PDD, It was considered 30 days per month and 12 months per year in the calculation of BE and PE. Calculation of BE and PE were corrected, considering 365 days per year.
Conclusion:	OK, sufficient information has been provided. CR is closed.

Clarification Request B3:	
CR	In section B.6.1 step 4, information is missing regarding the sample group of power units that has been chosen to calculate build margin emission factor.
CA:	The choice of the sample group of power units was described on section B.6.1, step 4.
Conclusion:	OK, the provided information was sufficient to close the CR.

4.2.5 Monitoring Methodology

The applied monitoring methodology is the approved methodology ACM0002 (Version 7) entitled "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

Since the same applicability criteria are to be applied as for the baseline methodology all criteria are met (see 4.2.1).

4.2.6 Monitoring Plan

The monitoring plan is documented according to the applied methodology. It provides for the collection and archiving of all relevant data.

The monitoring of all baseline parameters and project emissions is sufficiently addressed. Data relevant to calculate the grid emission factor will be made available by Brazilian DNA. Monitoring of leakage emissions is not necessary as leakage is not to be considered for this project activity.

The measurement equipment and the measurement methods are clearly described in the monitoring plan. The GHG emissions will be measured continuously with appropriate and state of the art equipment. The same monitoring equipment as already implemented in other comparable project activities is considered for monitoring.

The procedure for calibration & maintenance of monitoring equipment are clearly mentioned in the PDD. Regarding the control of documents and records of the monitored data the procedures of the existing quality management system of SHPs Moinho and Barracão will be applied.

In the course of the draft validation the following CRs were raised and successfully closed.

Clarification Request B4:	
CR	Revision of section B.7.1. is required with regarding to the following: - The monitoring parameters required to calculate the combined margin CO2 emission factor shall be included (cp. "Tool to calculate the emission factor for electricity system"). - A description of the number and location of electricity meters to measure EG_y and TEG_y is missing and shall be added. The recording frequency of both parameters shall be included. - The value of data applied to estimate the power density of the project activity shall be included. - The monitoring frequency of A_{PJ} shall be included.
CA:	Section B.7.1 was corrected according described below: • The monitoring parameters required to calculate the combined margin CO2 emission factor were included in the section B.7.1. • The recording frequency of EG_y and TEG_y was provided. • The number and location of electricity meters to measure EG_y and TEG_y was added. • The value of data applied to estimate the power density of the project activity was included. • The monitoring frequency of A_{PJ} was included.

Conclusion:	OK. This issue is now addressed sufficiently. CR is resolved.

Clarification Request B5:	
CR	There is monitoring of sustainable development indicators / environmental impacts as required per legislation. There are diverse monitoring programs. This statement contradicts information given in PDD, therefore correction is needed.
CA:	Although there are diverse Monitoring Programs, the impact of the Project's SHPs is considered small by Brazilian Laws. Monitoring Programs described on PDD were required to provide the minimum possible impact on the environment and society of the region. It is important to highlight that, although implantation of all Small Hydro Plant provides some impact, this impact is considered low and easier to mitigate. Monitoring Programs described on PDD follows the common requirements of Brazilian Institutions responsible for licensing process.
Conclusion:	OK. All the information provided was enough to proof that the project comply with the local and national laws. CR is resolved.

4.2.7 Project Management Planning

All authorities and responsibilities for the project management are clearly defined.

The training of the involved personnel is well organized. As per the procedures of SHPs, the quality management system and all employees being in charge of tasks related to the project activity will undergo intense training measures.

4.3 Crediting Period

The intended crediting period of the project is 7 years (2010 to 2017), renewable. The starting date of the crediting period is 01/02/2010 for the Moinho plant and 01/10/2010 for the Barracão plant.

Regarding the starting date of the project activity the following CAR C1 was raised and successfully closed.

Corrective Action Request C1:	
CAR	Inform the date on which the implementation or construction will start. Correction is necessary.
CA:	Date predicted to begin the construction was informed.
Conclusion:	The date was included. CAR is closed.

4.4 Environmental Impacts

An analysis of possible adverse environmental impacts was carried out. As a result it was determined, that no negative significant environmental impacts are to be expected. This issue has been sufficiently addressed in the PDD.

The proposed project activity includes the confirmation that all environmental requirements are met, and that the project complies with all relevant Brazilian laws.

Nevertheless at the stage of draft validation the following CR had to be raised.

Clarification Request D1:	
CR	Although programs to mitigate and minimize the impacts have been mentioned, it is necessary to describe the project specific environmental impacts.
CA:	Project specific environmental impacts were described on item D.2.
Conclusion:	OK. The PDD was revised accordingly. The project complies with the local and national pertinent laws. CR is closed.

4.5 Comments by Local Stakeholders

According to the Resolution number 1 of the Brazilian Inter-Ministerial Commission on Climate Change2, invitations for comments by local stakeholders are required by the Brazilian Designated National Authority (DNA) as part of the procedures for analyzing CDM projects and issuing letters of approval.

The DNA required project participants to communicate with the public through letters, to be sent inviting for comments to: Brazilian national NGO's forum; local attorneys' and prosecutors' agency; municipality's chamber (mayor and assembly men); State's and municipal's environmental authorities and local communities' associations.

As defined by the Designated National Authority (DNA), the project developer sent information letters to the key institutions, describing the major aspects of the implementation and operation of the proposed project. The project participant should leave 30 days opened for comments. No comments were received.

As a result from the stakeholder involvement process it can be concluded that no relevant concerns of the local stakeholders are existing. The stakeholder process was conducted in compliance with the requirements of the Brazilian DNA.

5 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the validation of CDM projects, TÜV NORD JI/CDM CP published the draft PDD on its website www.global-warming.de from 2008/05/27 to 2008/06/26 by parties, stakeholders and UNFCCC accredited non-governmental organisations. No comment was received.

6 VALIDATION OPINION

The Desenvix S.A. and Enerbio Consultoria Ltda have commissioned the TÜV NORD JI/CDM Certification Program to validate the project: *"CDM project of Moinho and Barracão small hydropower project"* with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords), and the relevant decisions by COP/MOP and CDM Executive Board.

The project activity consists of the supply of clean hydroelectric energy to the Brazilian National Interconnected System through the implementation and operation of Small Hydropower Plants (run-of-river) Moinho and Barracão with an installed capacity of 25.7 MW. A risk-based approach has been followed to perform this validation. In the course of the draft validation 4 Corrective Action Requests (CARs) and 8 Clarification Requests (CRs) were raised and successfully closed.

The review of the project design documentation 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 fulfilment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Brazil) and all relevant UNFCCC requirements for CDM. At the time of the completion of the validation the LoA is pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA could not be considered at the present validation stage.
- The project additionality is sufficiently justified in the PDD.
- 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 107,909 t CO_{2e} is most likely to be achieved within the 7 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.

Essen, 2009-02-25

Rainer Winter
TÜV NORD JI/CDM Certification Program
Validation Team Leader

Essen, 2009-02-25

Eric Krupp
TÜV NORD JI/CDM Certification Program
Senior Assessor

7 REFERENCES

Table 7-1: Documents provided by the project proponent

Reference	Document
/**BMB**/	Basic Project (SHP Barracão) – 8715/00-10-RL-0001-B (premise of power, firm and averagy energy)
/**BPD**/	Brazilian Decennial Plan for Electric Energy Expansion (2006-2015)
/**BPM**/	Basic Project (SHP Moinho) – 8729/00-10-RL-0001-D (premise of power, firm and average energy)
/**COME**/	Contract of Operation and Maintenance Service (SHP Esmeralda) of 2006/02/23
/**DFL**/	DOE/AIE Forum request letter for opportunity to assess that the "tool to calculate the emission factor for an electricity system" was correctly applied.
/**DNAOF**/	Brazilian DNA Official Letter inviting the DOE to have an opportunity to assess that the "tool to calculate the emission factor for an electricity system" was correctly applied.
/**DT**/	Depreciation Table (Desenvix – Energetic and Economic-Financial Study)
/**FASA**/	First Alternative Sources Auction - 2007
/**FCM**/	Financing Contract to Monjolinho Energética S.A. – protocol #1101411 of 2008/01/16 (premise of financing cost)
/**IA**/	Spreadsheet of investment analysis
/**MAP**/	Map of May/2008 – SHP Moinho
/**PDD**/	Project Design Document "CDM Project of Moinho and Barracão Small Hydropower Plant", version 01 of 2008/04/23 hosted for stakeholder commenting during 27/05/2008 to 26/06/2008 Project Design Document "CDM Project of Moinho and Barracão Small Hydropower Plant", version 02 of 2008/09/08
/**PLb**/	Protocol # 002902-05.67/08-0 to Preliminary License (SHP Barracão) of

Reference	Document
	2008/03/25
/**PLm**/	Preliminary License # 408/2008-DL (SHP Moinho) valid until: 2009/09/30
/**RSA**/	Report of Simplified Analysis (SHPs Barracão and Moinho)
/**TFSEE**/	ANEEL – Resolution #3731 of 2007/12/27 (premise of energy service inspection fee)
/**TUSD**/	ANEEL - Resolution #529 of 2007/08/06 (premise of tariff of use of distribution system)
/**UHSA**/	Financing Condition to Hydropower Plant Santo Antônio (premise of third party financial participation)
/**VLR**/	Voucher of received letter
/**XCS**/	Spreadsheet of emission reduction and emission factor calculation

Table 7-2: Background investigation and assessment documents

Reference	Document
/**ACM0002**/	Consolidated baseline methodology for grid-connected electricity generation from renewable sources (version 7)
/**CPM**/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/**GC**/	Guidelines for Completing the Project Design Document (CDM-PDD), and the Proposed New Baseline and Monitoring Methodologies (CDM-NM) – Version 6.2.
/**KP**/	Kyoto Protocol (1997)
/**MA**/	Decision 17/CP. 7 (Marrakesh – Accords)
/**R#1**/	Resolution #1 of Inter-Ministerial Commission of Global Change (2003) – Brazil
/**TA**/	Tool to demonstration and assessment of additionality (Version 5.2)
/**VVM**/	IETA, PCF Validation and Verification Manual (V.4)

Table 7-3: Websites used

Reference	Link	Organisation
/**aneel**/	http://www.aneel.gov.br/area.cfm?idArea=15&idPerfil=2	National Agency of Electric Energy
/**dna-br**/	http://www.mct.gov.br/index.php/content/view/3881.html	Ministry of Science and Technology (Brazil)
/**dna-ef**/	http://www.mct.gov.br/upd_blob/0024/24562.pdf	Ministry of Science and Technology (Brazil) (Clarification note of emission factor)
/**ipcc**/	www.ipcc-nggip.iges.or.jp	IPCC publications
/**ons**/	http://www.ons.org.br/home/	National Operator of the Electric System
/**tuv**/	http://www.global-warming.de	TÜV NORD JI/CDM CP
/**uhsa**/	http://www.bndes.gov.br/infraestrutura/uhsa.asp	National Bank of Sustainable Development (Brazil)
/**unfccc**/	http://cdm.unfccc.int	UNFCCC

Table 7-4: List of interviewed persons

Reference	MoI[1]		Name	Organisation / Function
/**IM01**/	V	☒ Mr. ☐ Ms.	M. Smaniotto	Technical, Desenvix S.A.
/**IM01**/	V	☒ Mr. ☐ Ms.	M. L. L. dos Santos	Engineer, Desenvix S.A.
/**IM01**/	V	☒ Mr. ☐ Ms.	E. Baltar	Consultant, Enerbio
/**IM01**/	V	☐ Mr. ☒ Ms.	G. A Ramos	Local Stakeholder, indemnified (land owner)

1) Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

ANNEX

Validation Protocol

ANNEX : VALIDATION PROTOCOL

Table 1: Mandatory Requirements for (CDM) Project Activities – to be filled in during FVR preparation

Requirement	Reference	Conclusion
Parties		
The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK Annex 1 Party will be identified in due time.
The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
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	(OK)
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 Procedures §40a	(OK)
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 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. No public funding was used to the project activity
Parties participating in the CDM shall designate a national authority for the	CDM Modalities and Procedures §29	OK. MCT is the Brazilian

Requirement	Reference	Conclusion
CDM.		national authority for the CDM.
The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	It's an unilateral project. Annex 1 Party will be identified in due time.
The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	It's an unilateral project. Annex 1 Party will be identified in due time.
Additionality		
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.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	~~CAR B2~~ OK

Requirement	Reference	Conclusion
Forecast emission reductions and environmental impacts		
The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	~~CAR B1~~ ~~CAR B3~~ ~~CR B2~~ OK
Environmental impacts (only for large scale projects)		
Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	~~CR D1~~ OK
Stakeholder involvement		
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
Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
A baseline shall be established on a project-specific basis, in a transparent	CDM Modalities and Procedures §45c,d	~~CAR B1~~

Requirement	Reference	Conclusion
manner and taking into account relevant national and/or sectoral policies and circumstances.		~~CR B2~~ ~~CR B3~~ OK
The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
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	~~CR B4~~ OK
Requirements for small-scale projects only		
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 debundled component of a larger project activity.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	N/A
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	N/A
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	N/A

Table 2: Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the spatial boundaries of the project (geographical) clearly defined?	/PDD/ (B.3)	DR, I	Yes, the spatial boundaries are defined as the physical power plants and the National Interconnected System. Coordinates (longitude / latitude) of SHP Moinho are mentioned (27°45'42'' S and 51°19'52'' W). But in section A.4.1.4 the exact coordinates (including seconds) for SHP Barracão shall be provided.	~~CR A1~~	OK
A.1.2. Are the system boundaries of the project (components and facilities used to mitigate GHGs) clearly defined?	/PDD/ (B.3)	DR, I	The project's system boundaries are clearly described in the project documentation. The greenhouse gases included in the project boundary have been addressed in table 7 (section B.3) of PDD.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2. Participation Requirements *Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.*					
A.2.1. Which Parties and project participants are participating in the project?	/PDD/ (A.3)	DR	It's a unilateral project hosted in Brazil with two project proponents.	OK	
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/dna-br/	DR, I	In accordance with the CDM M&P at the time of making the PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration the approval of the Parties involved is required. At the time of the completion of the validation the LoA is pending. For the Brazilian DNA a positive validation opinion is a prerequisite for the host government approval and thus the LoA could not be considered at the present validation stage. Corresponding changes of the project documentation due to the approval process will be addressed in a revision of the final validation report.	(OK)	
A.2.3. Do all participating Parties fulfil the participation requirements as follows:	/dna-br/	DR	Brazil, the host country, has ratified the Kyoto Protocol on 23rd August 2002. The	(OK)	

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	– Ratification of the Kyoto Protocol – Voluntary participation – Designated a National Authority			Brazilian DNA assigned for CDM is the "Global Climate Change international Commission". The voluntary participation is stated in the LoA which is pending. See comment A.2.2.		
A.2.4.	Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/PDD/ (A4.4)		No public funding is involved.	OK	
A.3.	**Technology to be employed** *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.3.1.	Does the project design engineering reflect current good practices?	/PDD/ (A.4) /IM01/	DR, I	Yes, it reflects good practices.	OK	
A.3.2.	Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/PDD/ (A.4.3)	DR	Yes, the equipments and technologies are developed in Brazil and adjusted to the project activity.	OK	
A.3.3.	Does the project make provisions for meeting training and maintenance needs?	/PDD/ (A.2) /ons/	DR	The manufacturers will provide training to the operators. The frequency of the calibration of	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			monitoring equipment is defined by NOS (National Operator of the Electric System) as a period of two years.		
A.4. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/R#1/	DR	The project is in line with current sustainable development priorities in Brazil. Nevertheless the Brazilian DNA will finally decide whether the project is in line with the sustainable development policies - considering the results of this validation report.	(OK)	
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/PDD/ (A.2) /AM01/	DR, I	Beyond the GHG emission reductions, there will be a region economic development due to taxes and tributes from the project activity and direct and indirect jobs will be created.	OK	
Small scale project activity *Is it assessed whether the project qualifies as small-scale CDM project activity*					
A.4.3. 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?			N/A		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.4.4. Is the small scale project activity not a debundled component of a larger project activity?			N/A		
A.5. General Topics					
A.5.1. Has the PDD been duly filled?	/PDD/ (B.7.1 and B.7.2)	DR	Yes, nevertheless the following editorial corrections are required: - In section B.8 the date of completion is not in the correct format. - In section C.1.2 and C.2.1.2 the operation lifetime of the project activity and the length of the crediting period respectively shall be stated in years and months. - The PDD includes in several sections of the PDD Portuguese parts of a sentence (e.g. B.5, B.6.1, B.6.2, 7.1, 7.2). - Explain all abbreviations used in the PDD (e.g. B.5).	~~CR A2~~	OK
A.5.2. Has all necessary information been made available to the validator?			Yes, the PP provided all information as far as required at the validation stage.	OK	
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/PDD/ (B.1., B.4.) /GC/	DR	The chosen baseline methodology refers to ACM0002: "Consolidated methodology for grid-connected electricity generation from renewable sources" – version 7. But, in section B.1 all tools the methodology draws upon and their version shall be indicated.	~~CR B1~~	OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/PDD/ (B.2.)	DR	Yes, the project activity meets all applicability criteria. The SHPs are new hydro power plants which result in new reservoirs and power densities greater than 4W/m^2.	OK	
B.2. Baseline Scenario Determination *The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.*					
B.2.1. What is the baseline scenario?	/PDD/ (B.4.) /ACM0002/ /GC/	DR	The baseline scenario is the generation of electricity through operation of grid-connected power plants and addition of new generation sources.	OK	
B.2.2. What other alternative scenarios have been considered and why is the selected	/PDD/ (B.4.)	DR	The continuity of the present scenario; the construction of a new mineral coal	OK	

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	scenario the most likely one?			thermoelectric power plant; and the project activity undertaken without being registered as a CDM Project.		
B.2.3.	Has the baseline scenario been determined according to the methodology?	/PDD/ (B.4.) /GC/	DR	Yes.	OK	
B.2.4.	Has the baseline scenario been determined using conservative assumptions where possible?	/PDD/ (B.4.)	DR	Yes.	OK	
B.2.5.	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/PDD/ (B.4.)	DR	Yes, it was considered the Brazilian Decennial Plan for Electric Energy Expansion (2006-2015).	OK	
B.2.6.	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/PDD/ (B.4.) /BPD/ /aneel/	DR	CO_2 emission factors of South Subsystem published by Brazilian DNA have been applied. However, Brazilian DNA has decided to adopt the configuration of a single electricity system in Brazil and revised grid emission factor calculation accordingly. Revision of the emission reduction calculation considering current available data is required and relevant sections in the PDD shall be adapted. Calculation of CO_2 emission factors shall be provided to DOE.	~~CAR B1~~	OK
B.2.7.	Have the major risks to the baseline been identified?	/PDD/ (B.4.)	DR	No major risks were identified.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3. Additionality Determination *The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.*					
B.3.1. Is the project additionality assessed according to the methodology?	/PDD/ (B.5.)	DR	Version 5.2 of the "Tool for the demonstration and assessment of additionality" has been applied as stipulated in ACM0002.	OK	
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/PDD/ (B.5.) /FCM/ /UHSA/ /TFSEE/ /TUSD/ /COME/ /FASA/ /IA/ /AM01/	DR, I	The investment analysis is available for SHP Moinho only and in parts not traceable. Revision is required as follows: - The investment analysis of SHP Barracão shall be provided. - WACC is an appropriate benchmark for project IRR. However, in the investment analysis equity IRR was used for comparison. Adequate benchmark shall be applied. - A list of all parameters considered in the investment analysis (IRR and WACC calculation) including value, unit, description, rationale of assumption and source shall be provided. All abbreviations shall be explained. - Clarification is required why taxes on gross revenue have been calculated without considering the operational	~~CAR B2~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			costs. - Clarification is also required whether personnel costs have been considered in the investment analysis. - The calculations of the parameters shall be explained more detailed. This applies especially to all calculations related to the funding of the project (e.g. Funding deflation index, Total depreciation). All data sheets the calculation refers to, shall be provided. - The spreadsheets of WACC calculation and sensitivity analysis shall be provided. - Clarification is required why "Commercialized Energy" is used for IRR calculation but "firm energy" to calculate ER. - Information within the tables shall be in English only. - According to the Guidelines for completing the PDD information used to determine additionality shall not be considered confidential. In case where project participant does not wish to make the spreadsheet submitted to the DOE available to the public an exact read-only or PDF shall be provided in addition for general		

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				publication.		
B.3.3.	Is sufficient evidence provided to support the relevance of the arguments made?	/PDD/ (B.5.) /FCM/ /UHSA/ /TFSEE/ /TUSD/ /COME/ /FASA/ /IA/	DR	See comment B.3.2.	~~CAR B2~~	OK
B.3.4.	If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/PDD/	DR	The starting date of the project activity is not before the validation date.	OK	
B.4.	**Calculation of GHG Emission Reductions – Project emissions** *It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.4.1.	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.6.1)	DR	The procedures to calculate project emissions follow the provisions of ACM0002 (version 7).	OK	
B.4.2.	Have conservative assumptions been used when calculating the project	/PDD/ (B.6.1 and	DR, I	The power density of SHP Moinho is greater than 10 W/m^2, so for this plant		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
emissions	B.7.2) /IM01/ /MAP/		PEy = 0. On the other hand, SHP Barracão has power density greater than 4 W/m^2 and less than 10 W/m^2, so PEy was considered in the calculation and for that objective; it has been considered the firm energy. The parameters "Medium Energy" and "Firm Energy" shall be defined and deduction of values explained. Moreover clarification is required why only 360 days and not 365 days has been considered in the calculation of BE and PE. Moreover, during the visit, it was informed that the projected dimension of SHP Moinho reservoir was changed, so correction of calculation is necessary.	~~CR B2~~ ~~CAR B3~~	OK OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/PDD/ (B.6.1)	DR	See comment B.4.2 for SHP Moinho.	~~CAR B3~~	OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions *It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.6.1)	DR	CO_2 emission factors of South Subsystem published by Brazilian DNA have been applied. However, Brazilian DNA has decided to adopt the configuration of a	~~CAR B1~~	OK

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				single electricity system in Brazil and revised grid emission factor calculation accordingly. Revision of the emission reduction calculation considering current available data is required and relevant sections in the PDD shall be adapted. Calculation of CO_2 emission factors shall be provided to DOE. In addition, in section B.6.1, step 4 information is missing regarding the sample group of power units that has been chosen to calculate build margin emission factor.	~~CR B3~~	OK
B.5.2.	Have conservative assumptions been used when calculating the baseline emissions	/PDD/ (B.6.1)	DR	The parameters "Medium Energy" and "Firm Energy" shall be defined and deduction of values explained. Moreover clarification is required why only 360 days and not 365 days has been considered in the calculation of BE and PE. See comment on B.5.1.	~~CR B2~~ ~~CAR B1~~	OK OK
B.5.3.	Are uncertainties in the baseline emission estimates properly addressed?	/PDD/ (B.6.1)	DR	See comment on B.5.1.	~~CAR B1~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6. Calculation of GHG Emission Reductions – Leakage *It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.*					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.6.1)	DR	There is no leakage considered in the project.	OK	
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/PDD/ (B.6.1)	DR	See comments B 6.1.	OK	
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/PDD/ (B.6.1)	DR	See comments B 6.1.	OK	
B.7. Emission Reductions *The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.*					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/PDD/ (B.6.4) /dna-ef/	DR	The project activity reduces the GHG emissions, avoiding the generation of electricity through sources of fossil fuels with consequent CO_2 emissions, which would be produced if the project did not exist. Nevertheless comments in section B.4.1	~~CAR B1, CAR B3, CR B2~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			und B 5.1 shall be considered.		
B.8. Monitoring Methodology *It is assessed whether the project applies an appropriate monitoring methodology.*					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.7.) /GC/	DR	Revision of section B.7.1. is required with regarding to the following: - The monitoring parameters required to calculate the combined margin CO2 emission factor shall be included (cp. "Tool to calculate the emission factor for electricity system"). - A description of the number and location of electricity meters to measure EG_y and TEG_y is missing and shall be added. The recording frequency of both parameters shall be included. - The value of data applied to estimate the power density of the project activity shall be included. - The monitoring frequency of A_{PJ} shall be included.	~~CR B4~~	OK
B.8.2. 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, for this	/PDD/ (B.7.2)	DR	Yes.	OK	

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	project activity, whichever occurs later?					
B.9. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*						
B.9.1.	Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/PDD/ (B.7) (Annex 4)	DR	The value of data applied to estimate the power density of the project activity and the monitoring frequency of A_{PJ} shall be included in section B.7.1.	~~CR B4~~	OK
B.9.2.	Are the choices of project GHG indicators reasonable and conservative?	/PDD/ (B.7)	DR	See comment B.9.1.	OK	
B.9.3.	Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/PDD/ (B.7.2)	DR	Yes, the measurement method used is according to ACM0002.	OK	
B.9.4.	Is the measurement equipment described and deemed appropriate?	/PDD/ (B.7.2)	DR	See comment B 9.1.	OK	
B.9.5.	Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/PDD/ (B.7.2)	DR	See comment B 9.1.	OK	
B.9.6.	Is the measurement interval identified and deemed appropriate?	/PDD/ (B.7.2)	DR	See comment B 9.1.	~~CR B4~~	OK
B.9.7.	Is the registration, monitoring, measurement and reporting procedure defined?	/PDD/ (B.7.2)	DR	The PE will be monitored by the project proponents.	OK	

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.9.8.	Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?	/PDD/ (B.7.2) (Annex 4) /ons/	DR	The calibration intervals are according to NOS recommendation.	OK	
B.9.9.	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/PDD/ (B.7.2) (Annex 4)	DR	Yes, it is evidenced on section B.7.2 in the Process Description and Annex 4.	OK	
B.10.	**Monitoring of Baseline Emissions** *It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.*					
B.10.1.	Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/PDD/ (B.7) (Annex 4)	DR	Revision of section B.7.1. is required with regarding to the following: - The monitoring parameters required to calculate the combined margin CO2 emission factor shall be included (cp. "Tool to calculate the emission factor for electricity system"). - A description of the number and location of electricity meters to measure EG_y and TEG_y is missing and shall be added. The recording frequency of both parameters shall be included.	~~CR B4~~	OK
B.10.2.	Are the choices of baseline GHG indicators reasonable and conservative?	/PDD/ (B.7)	DR	See comment B.10.1.	~~CR B4~~	OK
B.10.3.	Is the measurement method clearly stated	/PDD/	DR	The data to calculate the emission	OK	

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	for each baseline indicator to be monitored and also deemed appropriate?	(B.7)		reduction will be obtained by monitoring spreadsheet of CCEE (available on its website) and receipt of sales (if necessary). The ex-post emission factor will be calculated based on data provided by the Brazilian DNA/NOS.		
B.10.4.	Is the measurement equipment described and deemed appropriate?	/PDD/ (B.7) (Annex 4)	DR	Yes.	OK	
B.10.5.	Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/PDD/ (B.7) (Annex 4)	DR	The CCEE's registered data will be considered, in case of erroneous measurements.	OK	
B.10.6.	Is the measurement interval for baseline data identified and deemed appropriate?	/PDD/ (B.7) (Annex 4)	DR	See comment B.10.1	~~CR B4~~	OK
B.10.7.	Is the registration, monitoring, measurement and reporting procedure defined?	/PDD/ (B.7) (Annex 4)	DR	See comment B.9.9.	OK	
B.10.8.	Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?	/PDD/ (B.7) (Annex 4)	DR	The calibration intervals are according to NOS recommendation.	OK	
B.10.9.	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/PDD/ (B.7) (Annex 4)	DR	See comment B.9.9.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.11. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/PDD/ (B.7)	DR	There is no leakage considered in the project.	OK	
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/PDD/ (B.7)	DR	See comment B 11.1	OK	
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/PDD/ (B.7.2)	DR	See comment B 11.1	OK	
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/PDD/ (B.7. and D.2) /PL/	DR	There is monitoring of sustainable development indicators / environmental impacts as required per legislation. There are diverse monitoring programs. This statement contradicts information given in PDD, therefore correction is needed.	~~CR B5~~	OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data	/PDD/ (B.7.)	DR	See comments B.12.1	OK	

	CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	concerning environmental, social and economic impacts?					
B.12.3.	Are the sustainable development indicators in line with stated national priorities in the Host Country?	/PDD/ (B.7.)	DR	The letter of approval is pending.	(OK)	
B.13.	**Project Management Planning** *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
B.13.1.	Is the authority and responsibility of overall project management clearly described?	/PDD/ (B.7.2) (Annex 4) /GC/ /IM01/	DR, I	The responsibilities are clearly addressed.	OK	
B.13.2.	Are procedures identified for training of monitoring personnel?	/PDD/	DR, I	See comment A.3.3.	OK	
B.13.3.	Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/PDD/	DR	Unintended emissions are not possible in this activity project.	OK	
B.13.4.	Are procedures identified for review of reported results/data?	/PDD/ (B.7.2)	DR	The internal information can be compared with data available on CCEE website.	OK	
B.13.5.	Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/PDD/ (B.7.2)	DR	See comment B 13.4.	OK	

C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/PDD/ (C.1.)	DR	Inform the date on which the implementation or construction will be started. Correction is necessary. The operation lifetime is 30 years.	~~CAR C1~~	OK
C.2. Is the start of the crediting period clearly defined and reasonable?	/PDD/ (C.2.) /GC/	DR	Yes, a renewable crediting period with a length of seven years for the first period is chosen. The starting date of the crediting period is clearly defined, 2010-02-01.	OK	
D. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
D.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/PDD/ (D.2.)	DR	Although programs to mitigate and minimize the impacts have been mentioned, it is necessary to describe project specific environmental impacts.	~~CR D1~~	OK
D.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/PDD/ (D.1. and D.2) /RAS/ /PL/	DR	Yes, the Report of Simplified Analysis (RSA) is available for both SHPs.	OK	

D.3.	Will the project create any adverse environmental effects?	/PDD/ (D.1. and D.2) /RAS/	DR	Yes, the adverse environmental effects will be treated.	OK	
D.4.	Are transboundary environmental impacts considered in the analysis?	/PDD/ (D.1.)	DR	No transboundary effects are expected.	OK	
D.5.	Have identified environmental impacts been addressed in the project design?	/PDD/ (D.1 and D.2.) /RAS/	DR	Yes.	OK	
D.6.	Does the project comply with environmental legislation in the host country?	/PDD/ (D.1.) /PL/	DR	Yes, the project has received the necessary consents and permissions from the statutory bodies for its current phase.	OK	
For Small-scale projects						
D.7.	Does host country legislation require an analysis of the environmental impacts of the project activity?			N/A		

D.8.	Does the project comply with environmental legislation in the host country?			N/A		
D.9.	Will the project create any adverse environmental effects?			N/A		
D.10.	Have environmental impacts been identified and addressed in the PDD?			N/A		
E. Stakeholder Comments *The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.*						
E.1.	Have relevant stakeholders been consulted?	/PDD/ (E.1.)	DR	Yes, in Section E.1 an overview of the consulted stakeholders is provided.	OK	
E.2.	Have appropriate media been used to invite comments by local stakeholders?	/PDD/ (E.1.)	DR	Letters were sent to institutions listed on the PDD.	OK	
E.3.	If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/dna-br/	DR	The stakeholder process is conducted in compliance with the requirements of the Brazilian DNA.	OK	
E.4.	Is a summary of the stakeholder comments received provided?	/PDD/ (E.2.)	DR	No comments have been received so far.	OK	
E.5.	Has due account been taken of any stakeholder comments received?	/PDD/ (E.3.)	DR	See comment E. 4	OK	

Table 3: Resolution of Corrective Action and Clarification Requests

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR B1 CO_2 emission factors of South Subsystem published by Brazilian DNA have been applied. However, Brazilian DNA has decided to adopt the configuration of a single electricity system in Brazil and revised grid emission factor calculation accordingly. Revision of the emission reduction calculation considering current available data is required and relevant sections in the PDD shall be adapted. Calculation of CO_2 emission factors shall be provided to DOE.	B.2.6 B.5.1 B.5.2 B.5.3 B.7.1	Emission Reduction calculation was corrected considering the decision of Brazilian DNA. New Emission Reduction Calculation and New Emission Factor will be provided to DOE. The calculation of CO2 emission factors were provided by Brazilian DNA. Spreadsheet with data made available by Brazilian DNA was sent to DOE and the link where this information is available is described in the PDD.	OK. All relevant sections were corrected according to the new emission factor used. CAR is closed.
CAR B2 The investment analysis is available for SHP Moinho only and in parts not traceable. Revision is required as follows: - The investment analysis of SHP Barracão shall be provided. - WACC is an appropriate benchmark for project IRR. However, in the investment analysis equity IRR was used for comparison. Adequate benchmark shall be applied. - A list of all parameters considered in the investment analysis (IRR and WACC calculation) including value, unit, description, rationale of assumption and source	B.3.2, B.3.3	• The investment analysis of SHP Barracão was provided. It is the same spreadsheet of SHP Moinho. To check information about SHP Barracão investment analysis is necessary to select the option of SHP Barracão on **Cell D4**. • WACC and Project IRR were applied.	The provided data was enough to finalise the assessment of the investment analyses. CAR is closed.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
shall be provided. All abbreviations shall be explained. - Clarification is required why taxes on gross revenue have been calculated without considering the operational costs. - Clarification is also required whether personnel costs have been considered in the investment analysis. - The calculations of the parameters shall be explained more detailed. This applies especially to all calculations related to the funding of the project (e.g. Funding deflation index, Total depreciation). All data sheets the calculation refers to, shall be provided. - The spreadsheets of WACC calculation and sensitivity analysis shall be provided. - Clarification is required why "Commercialized Energy" is used for IRR calculation but "firm energy" to calculate ER. - Information within the tables shall be in English only. - According to the Guidelines for completing the PDD information used to determine additionality shall not be considered confidential. In case where project participant does not wish to make the spreadsheet submitted to the DOE available to the public an exact read-only or PDF shall be provided in addition for general publication.		• All parameters considered in investment analysis were described and all abbreviations explained. • SHP Moinho and Barracão will be taxed on Brazilian Tax System called "Presumed Profit" (from the Portuguese: Lucro Presumido". These projects can apply this Tax System because they have less annual revenue than R$ 48 Million, as indicated by Brazilian Laws. This Tax System applies taxes on Gross Revenues and not on Profits. Project Participants follows Brazilian Laws to calculate Taxes. All Laws that support these assumptions are described on PDD. • Personnel costs are included in O&M (Operation and Maintenance) Costs. Therefore, they were considered in the investment analysis. • Investment Analysis was corrected and all parameters	

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
		and calculations (mainly, related to the funding of the project) were described more detailed. • Spreadsheets of WACC calculation and sensitivity analysis were sent to DOE. • Emission Reduction was calculated again with "Commercialized Energy".	
CAR B3 During the visit, it was informed that the projected dimension of SHP Moinho reservoir was changed, so correction on calculation is necessary.	B.4.2 B.4.3 B.7.1	The dimension of SHP reservoir was changed. Necessary Corrections were made.	OK the PDD was revised accordingly. CAR is closed.
CAR C1 Inform the date on which the implementation or construction will start. Correction is necessary.	C.1	Date predicted to begin the construction was informed.	The date was included. CAR is closed.
CR A1 In section A.4.1.4 the exact coordinates (including seconds) for SHP Barracão shall be provided.	A.1.1	The exact coordinates (including seconds) for SHP Barracão was provided.	OK, data is provided. CR is resolved
CR A2 The following editorial corrections are required: - In section B.8 the date of completion is not in the correct format. - In section C.1.2 and C.2.1.2 the operation lifetime of the project activity and the length of the crediting	A,5,1	• In section B.8 the date of completion was corrected; • In section C.1.2 and C.2.1.2 the operation lifetime of the project activity and the length of the crediting period were	OK, all appointed issues were corrected and all information necessary are now available.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
period respectively shall be stated in years and months. - The PDD includes in several sections of the PDD Portuguese parts of a sentence (e.g. B.5, B.6.1, B.6.2, 7.1, 7.2). - Explain all abbreviations used in the PDD (e.g. B.5).		stated in years and months. • Portuguese parts of some sentence were translated in English. All abbreviations were explained.	CR is closed.
CR B1 In section B.1 all tools the methodology draws upon and their version shall be indicated.	B.1.1	All tool and methodologies (and their versions) used were indicated.	OK, information was included in the PDD. CR is closed.
CR B2 The parameters “Medium Energy” and “Firm Energy” shall be defined and deduction of values explained. Moreover clarification is required why only 360 days and not 365 days has been considered in the calculation of BE and PE.	B.4.2 B.5.2 B.7.1	Parameters “Medium Energy” and “Firm Energy” were defined on item A.4.3. In the first version of the PDD, It was considered 30 days per month and 12 months per year in the calculation of BE and PE. Calculation of BE and PE were corrected, considering 365 days per year.	OK,, sufficient information has been provided. CR is closed.
CR B3 In section B.6.1 step 4 information is missing regarding the sample group of power units that has been chosen to calculate build margin emission factor.	B.5.1	The choice of the sample group of power units was described on section B.6.1, step 4.	OK, the provided information was sufficient to close the CR.
CR B4 Revision of section B.7.1. is required with regarding to the	B.8.1 B.9.1	Section B.7.1 was corrected according described below:	OK, this issue is now addressed

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
following: - The monitoring parameters required to calculate the combined margin CO2 emission factor shall be included (cp. "Tool to calculate the emission factor for electricity system"). - A description of the number and location of electricity meters to measure EG_y and TEG_y is missing and shall be added. The recording frequency of both parameters shall be included. - The value of data applied to estimate the power density of the project activity shall be included. - The monitoring frequency of A_{PJ} shall be included.	B.10.1	• The monitoring parameters required to calculate the combined margin CO2 emission factor were included in the section B.7.1. • The recording frequency of EG_y and TEG_y was provided. • The number and location of electricity meters to measure EG_y and TEG_y was added. • The value of data applied to estimate the power density of the project activity was included. The monitoring frequency of A_{PJ} was included.	sufficiently. CR is closed.
CR B5 There is monitoring of sustainable development indicators / environmental impacts as required per legislation. There are diverse monitoring programs. This statement contradicts information given in PDD, therefore correction is needed.	B.12.1	Although there are diverse Monitoring Programs, the impact of the Project's SHPs is considered small by Brazilian Laws. Monitoring Programs described on PDD were required to provide the minimum possible impact on the environment and	OK. All the information provided was enough to proof that the project comply with the local and national laws. CR is closed.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
		society of the region. It is important to highlight that, although implantation of all Small Hydro Plant provides some impact, this impact is considered low and easier to mitigate. Monitoring Programs described on PDD follows the common requirements of Brazilian Institutions responsible for licensing process.	
CR D1 Although programs to mitigate and minimize the impacts have been mentioned, it is necessary to describe the project specific environmental impacts.	D.1	Project specific environmental impacts were described on item D.2.	Ok. The PDD was revised accordingly. The project complies with the local and national pertinent laws. CR is closed.