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Validation Report

BERTIN LTDA.

Validation of the Brasil Central Energia S.A. – Sacre 2 Small Hydro Power Plant Project

Report No. 893664, rev. 3

30.05.2007

TÜV SÜD Industrie Service GmbH
Carbon Management Service
Westendstr. 199 - 80686 Munich – GERMANY

Industrie Service

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Subject:	Validation of a CDM Project
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Contact:	www.tuev-sued.de
Client:	Bertin Ltda. Parque Industrial Cx. Postal 211 Lins, Sao Paulo ZIP code: 16404-110 Brazil.
Contract approved by:	Werner Betzenbichler
Report Title:	Brasil Central Energia S.A. – Sacre 2 Small Hydro Power Plant Project
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Summary:

The Certification Body ”Climate and Energy” has been ordered by Bertin Ltda. and Ecoinvest Carbon Brasil Ltda. to perform a validation of the above mentioned project.

In summary, it is TÜV SÜD´s opinion that the project “Brasil Central Energia S.A. – Sacre 2 Small Hydro Power Plant Project”, as described in the revised project design document of May 28, 2007, meets all relevant UNFCCC requirements for the CDM, set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board and that the project furthermore meets all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 6, May 19th,2006).

Hence, TÜV SÜD will recommend the project for registration as CDM project activity by the CDM Executive Board.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 445,961 tonnes CO_{2e} over a crediting period of seven years, resulting in a calculated annual average of 63,709 tonnes CO_{2e} represents a reasonable estimation using the assumptions given by the project documents.

Work carried out by:	Markus Knödlseder Johann Thaler	Internal Quality Control by:	Werner Betzenbichler

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CR	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
ONS	Operador Nacional do Sistema Eletrico
PDD	Project Design Document
SHP	Small Hydroelectric Power Plant
TÜV SÜD	TÜV SÜD Industrie Service GmbH
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

Table of Contents

1 INTRODUCTION

1.1 Objective

Ecoinvest Carbon Brasil Ltda. has commissioned TÜV SÜD Industrie Service GmbH (TÜV SÜD) to validate the Brasil Central Energia S.A. – Sacre 2 Small Hydro Power Plant Project. The validation serves as design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country 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 a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. TÜV SÜD has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The audit team has been provided with the first PDD-version in September 2006. Based on this documentation a document review and a fact finding mission in form of an on site audit has taken place. The demanded additional information is addressed in annex 1. Requested information was given and the PDD was updated accordingly. That final PDD version 9 was submitted on May 28, 2007 and serves as the basis for the final assessment presented herewith. In the final PDD some information has been added and changed. However, the changes were not significant, thus it was not necessary to repeat the global stakeholder process.

Studying the existing project documentation, it was obvious that the competence and capability of the validation team has to cover at least the following aspects:

- Knowledge of Kyoto Protocol and the Marrakech Accords
- Environmental and Social Impact Assessment
- Skills in environmental auditing (ISO 14000, EMAS)
- Quality assurance
- Operations in SHPs including knowledge about technology used in small hydropower plants.
- Monitoring concepts
- Political, economical and technical random conditions in host country

According to these requirements TÜV SÜD has assembled a project team in accordance with the appointment rules of the TÜV certification body "climate and energy":

Markus Knödlseder is an auditor for climate change projects and GHG emission inventories at the department "Carbon Management Service" in the head office of TÜV SÜD Industrie Service GmbH, Munich. He has been involved in the topic of environmental auditing, baselining, monitoring and verification due to the requirements of the Kyoto Protocol since Oct. 2001. His main focus lies on renewable energies.

Johann Thaler graduated as Master of environmental Economy at the University of Augsburg. During his study he got first experiences in environmental management systems. His master thesis was about a fuel switch program in Brazil as a CDM project. Based in Brazil he has been working for TÜV SÜD as a GHG auditor on freelance basis since March 2005.

The audit team covers following requirements:

- Knowledge of Kyoto Protocol and the Marrakech Accords (All)
- Environmental and Social Impact Assessment (All)
- Skills in environmental auditing (ISO 14000, EMAS) (Knoedlseder)
- Quality assurance (Knödlseder)
- Operations in SHPs including knowledge about technology used in small hydropower plants (All)
- Monitoring concepts (All)
- Political, economical and technical random conditions in host country (Thaler)

In order to have an internal quality control of the project, a team of the following persons has been composed by the certification body "climate and energy":

Werner Betzenbichler (head of certification body)

1.3 GHG Project Description

The project consists of a small hydroelectric power plant (SHP) called Sacre 2 with 30 MW of installed capacity. The plant is located in Brasnorte on the Sacre River, in the state of Mato Grosso, Midwest region of Brazil. The power plant became operational in September, 2006.

The main objective of "Sacre 2 Small Hydro Power Plant Project" is to supply the grid with clean, renewable hydroelectric power while contributing to the regional/local economic development.

Brasil Central Energia S.A., the owner of Sacre 2 Project, is a company from Bertin Group. Bertin Group is a holding 100% national and has 28 productive units with divisions in: farming, food, biodiesel, cosmetic, leather, dog toy, individual protection equipments, industrial hygiene and cleaning, energy, transport, sanitation and construction.

The estimated amount of GHG emission reductions from the project is 445,961 tonnes of CO_{2e} during the first crediting period (7 years) resulting in estimated average annual emission reductions of 63,709 tonnes of CO_{2e}.

Project participants are Brasil Central Energia S.A. and Ecoinvest Carbon Brasil Ltda. Host Party of the project activity is Brazil and it consists of a unilateral project.

The sectoral category of the project activity is Sectoral Scope: 1 – Energy industries (renewable - / non-renewable sources). "Sacre 2 Small Hydro Power Plant Project" generates renewable electricity for the Brazilian South-Southeast-Midwest interconnected grid.

The approved and applied baseline and monitoring methodology is ACM0002 - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 6, May 19th,2006).

According to the PDD and involved parties the starting date of the project activity is September 14, 2006. The crediting period is committed as a 7 years renewable crediting period and it starts on November 05, 2007.

2 METHODOLOGY

The validation of the project consists of the following three phases:

- Desk review
- Follow-up interviews
- Resolution of clarification and corrective action requests

In order to ensure transparency, a validation protocol was customized for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol is enclosed in Annex 1 to this report.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	**Reference**	**Conclusion**	**Cross reference**
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.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

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 seven different sections. Each section is then further subdivided. 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 summarized in this section.	This section should summarize 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

2.1 Review of Documents

The project design document submitted by the client and additional background documents related to the project design and baseline were reviewed. The audit team has been provided with the first PDD-version issued on September 15, 2006 which had been made public on www.netinform.de. The project design document was assessed by a revision due to a corrective action request and clarification requests issued by TÜV SÜD. The final updated PDD version 9 issued on May 28, 2007 serves as the basis for the assessment presented herewith.

2.2 Follow-up Interviews

In October 2006 TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Brasil Central Energia S.A. and Ecoinvest Carbon Brasil Ltda. were interviewed. The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
Representatives of Brasil Central Energia S.A.	• Project design • Technical equipment • Sustainable development issues • Additionality • Crediting period • Monitoring plan • Management system • Environmental impacts • Stakeholder process
Ecoinvest Carbon Brasil Ltda.	• Project design • Technical equipment

	• Sustainable development issues • Baseline determination • Additionality • Crediting period • Monitoring plan • Environmental impacts • Stakeholder process • Approval by the host country

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD's positive conclusion on the project design. The Corrective Action Requests (CAR) and Clarification Requests (CR) raised by TÜV SÜD were resolved during communications between the Client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that have been given are summarized in chapter 3 below and documented in more detail in the validation protocol in Annex 1.

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

3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

1) The findings from the desk review of the project design documents and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Validation Protocol in Annex 1.

2) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to fulfil project objectives, a Clarification Request or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Annex 1. The validation of the project resulted in two Corrective Action Requests and six Clarification Requests.

3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and TÜV SÜD to resolve these Clarification or Corrective Action Requests is summarized.

4) The final conclusions for validation subject are presented.

The validation findings relate to the project design as documented and described in the final project design documentation.

3.1 General Description of Project Activity

3.1.1 Discussion

The project participants are Brasil Central Energia S.A. and Ecoinvest Carbon Brasil Ltda. The project is developed by Ecoinvest Carbon Brasil Ltda. Brazil as the host Party meets all relevant participation requirements. But the project has not been approved by the national DNA yet and no Letter of Authorization has been issued.

The objective of the project ”Brasil Central Energia S.A. – Sacre 2 Small Hydro Power Plant Project” is to avoid greenhouse gas emissions by Sacre 2 Small Hydro Power Plant through supplying clean, renewable electricity to the Brazilian South-Southeast-Midwest interconnected grid system and thus avoiding the use of fossil fuel fired thermal plants. Besides, the project contributes to environmental, social and economic sustainability by increasing the renewable energy’s share of the total Brazilian electricity consumption. The project design does reflect current good practice. The design has been professionally developed. A validation of the compatibility of the single components carried out by the project developer resulted in a positive conclusion. The project does moreover apply state of the art equipment.

The project boundaries are clearly defined. The South-Southeast-Midwest interconnected subsystem of the Brazilian grid where the project activity is located is considered as the spatial boundary. Considering that Sacre 2 has no reservoir, there are no emissions from the project activity neither a spatial boundary for project activity emissions.

The project equipment can be expected to run for the whole project period and it can not be expected that it will be replaced by more efficient technologies. Initial training and maintenance efforts are required. In the PDD and during the visit on site the project developer confirmed that such training has taken place and/or is envisaged.

The project is currently in line with the relevant legislation and plans in the host country. The required environmental licenses are valid and have been submitted to the validation team.

The project is fulfilling the requirements made by the Brazilian DNA and is considered to be in line with the sustainable development policies of Brazil as destruction of GHG emissions in order to combate global climate change and increase the share of renewable energies are relevant issues in the national Brazilian policy. The question can finally be answered after the issuance of the Letter of Approval by the Brazilian DNA.

The environmental impacts of the project are considered small by the host country definition of small-hydro plants, principally as well because the project consists of a run-of-river hydro plant. Thus, no water reservoir is necessary for the project, what avoids possible environmental impacts.

The funding for the project does not lead to a diversion of official development assistance, as according to the information obtained by the audit team, ODA does not contribute to the financing of the project.

The project starting date and the operational lifetime are clearly defined. The crediting period is clearly defined.

3.1.2 Findings

Corrective Action Request 1:

Page 3 (line 3), page 4 (line 6), page 6 (A.4.2.), page 9 (B.3.), page 21 (Step 5), page 36 and page 38 of the PDD are mentioning Sacre II as hydro-power plant with reservoir. Ecoinvest should correct the type of power plant to run-of-river as it has been identified on-site by the validation team.

Answer:

Information has been amended in the last submitted PDD.

Corrective Action Request 2:

Ecoinvest has to update the PDD with the new project start of April 1st, 2007 and thus change the emission reduction calculation.

Answer:

Information has been updated in the last submitted PDD. The project start is determined for September 14, 2006.

Clarification Request 1:

The description of the project activity should include the emission projection, i.e. how many tonnes CO2 the project will reduce.

Answer:

The emission projection is presented in A.4.4. It shows estimated amount of emission reductions over the chosen crediting period.

Clarification Request 2:

The sectoral category 01 should be mentioned in the PDD under A.4.2.

Answer:

Information has been updated in the last submitted PDD.

3.1.3 Conclusion

The corrective action and clarification requests have been resolved and the project does comply with the requirements.

Further details to that conclusion are documented in annex 1 of that validation report.

3.2 Baseline Methodology

3.2.1 Discussion

The project is based on the approved methodology: ACM0002 - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources". The most updated version 6 of the methodology has been approved by the CDM Executive Board on May 19th, 2006. The selected methodology has been designed for this project and hence the project is part of the methodology on which it is build upon. Therefore the respective baseline methodology is deemed to be the most applicable one for this project. The PDD responds convincingly to each of the applicability criteria which are outlined in the baseline methodology.

The application of the methodology and the discussion and determination of the baseline are transparent. The application follows exactly each of the steps outlined in the methodology and answers the corresponding sections in a proper manner.

The baseline is been determined using reliable assumptions. The parameter "Electricity generation of the project delivered to the grid" as one of the decisive parameters for the quantitative prognosis is determined by flow-meters. The energy meters (two) are specified by the energy distribution company and approved by ONS. Sacre 2 utilizes an ION 8600, SM 3050/3 type, manufactured by Schlumberger. These meters are calibrated by CEMAT - Centrais Elétricas Matogrosses S.A at every 2 years, according NBR 14521 (Brazilian Norms – Proceedings for accepting a portion of electric energy electronic meters, from the Portuguese *Procedimentos de Aceitação de lotes de medidores eletrônicos de energia elétrica*). The equipments and meters used in Sacre 2 SHP have been successfully applied to similar projects in Brazil and around the world and have by legal requirements extremely low level of uncertainty. Measurements are controlled in real time by the SHP Digital System and compared between the two meters at the substation, so that any problems can be detected (like water shortage, materials inside the turbines, meter inaccuracy, etc). In case of any problem, plant personnel will be put in action.

During the visit on site this measurement approach has been confirmed by the owner of the project.

Regarding the emissions factor, as a decisive parameter for the calculation of the baseline, the project participants decided at the end of the validation process to switch from the ex-post approach to the ex-ante approach.

The validation team has been informed the project participants that data of 2006 are already available to calculate the emissions factor for 2006. However, as Brazil has a large number of power plants and the system is very complex, the calculation of the Operating Margin emission factor (EF_{OM}) demands a long time for analyzing the data, calculation and revision. At the time of concluding the validation for the purpose of submitting the validation report to the DNA, no further current data than here presented was available. Due to that the emissions factor calcula-

tion of 2005 (0.2611 tCO2/MWh) is based on data from the National Dispatch Center ONS from 2003, 2004 and 2005.

In order to determine if the project activity is additional, the additionality tool approved by the Executive Board is applied, with the following steps:

Additionality of the project activity according to PDD	**Evaluation by Validation Team**
Step 0: Not applicable.	The validation team agrees that Step 0 of additionality tool is not applicable.
Step 1. Identification of alternatives to the project activity consistent with current laws and regulations Sub-step 1a. Define alternatives to the project activity Sub-step 1b. Enforcement of applicable laws and regulations:	The validation team agrees that the continuation of the baseline situation is the most likely scenario. At the moment of validation both the baseline scenario and the project scenario are in compliance with all regulations.
Step 2. Investment analysis	The investment analysis has not been applied.
Step 3. Barrier analysis	The investment and institutional barriers mentioned in the PDD are plausible and the validation team agrees that they are obstacles for the implementation of the project. The cash-flow calculation including the calculation of the IRR (Internal Rate of Return) without and with CER credits (see Annex 3) made by Ecoinvest shows how the CER revenues help to overcome the investment barrier.
Step 4. Common Practice Analysis Sub-step 4a: Analyse other activities similar to the proposed project activity Sub-step 4b: Discuss any similar options that are occurring	According to local experience the validation team agrees that similar projects being developed in the country are participating in the PROINFA Program, and those which are not part of the PROINFA program are realised as CDM projects.
Step 5. Impact of CDM registration	The validation team is convinced that the project will not be implemented in the foreseeable future without CDM

Concluding it can be stated that it has been made plausible that the chosen baseline scenario is the one deemed most realistic under the given frame conditions.

References have been made to all data sources used.

3.2.2 Findings

None

3.2.3 Conclusion

The project does comply with the requirements. The calculation of the South-Southeast-Midwest grid factor according to the ACM0002 is based on the years 2003, 2004 and 2005. More recent data are not available so far. The validation team, however, agrees to that calculation and data

basis only on the assumption that during the issuance of the Letter of Approval by the Brazilian Designated National Authority the available data basis can not be updated. In case of updated available data the appropriate grid factor has to be updated.

Further details to that conclusion are documented in annex 1 of that validation report.

3.3 Duration of the Project / Crediting Period

3.3.1 Discussion

According to the PDD and involved parties the starting date of the project activity is on September 14, 2006. The crediting period is committed as a 7 years renewable crediting period and it starts on November 5, 2007.

3.3.2 Findings

None

3.3.3 Conclusion

The project does comply with the requirements. Further details to that conclusion are documented in annex 1 of that validation report.

3.4 Monitoring Plan

3.4.1 Discussion

The project is based on an approved monitoring methodology ACM0002 - “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”. The most updated version 6 of the methodology has been approved by the CDM Executive Board on May 19th, 2006.

The selected methodology has been designed for this project and hence the project is part of the methodology it is build upon. Therefore the respective monitoring methodology is deemed to be the most applicable one for this project. The PDD responds convincingly to each of the applicability criteria which are outlined in the monitoring methodology.

Details of the methodology as parameters to be obtained, recording frequency and archiving methods are considered being reasonable and appropriate.

The monitoring plan does include all relevant parameters to determine baseline emissions and it is possible to monitor and/or measure the currently specified GHG indicators. The indicators which are not measured can be obtained from IPCC documents. The parameters defined allow calculating the baseline emissions in a proper manner.

The project is considered to have no negative environmental, social and economic effects and a monitoring of such data is also not required by the applied monitoring methodology. This approach is deemed sufficient.

It is clearly determined who will be responsible for registration, monitoring, measurement, reporting, maintenance and operation and who will be responsible for calibration of the flowmeters.

3.4.2 Findings

Clarification Request 4:

Table B.7.1. of the PDD should mention the uncertainty levels for the parameters EF_y, EG_y and m^2.

Answer:

Information regarding uncertainty level of the variables was included in the last submitted PDD.

Clarification Request 5:

There were no documented procedures to cover those situations. The operation, maintenance and emergency manual which are mentioned in Annex 4 (Monitoring Plan) should be provided to the validation team.

Answer:

Annex 4 (Monitoring Plan) has been changed. The operation maintenance and emergency manual is not mentioned anymore.

Contract between Rede Comercializadora de Energia S/A who will be responsible for the operation and maintenance of Sacre 2 SHP and Sacre 2 has been submitted to the validation team.

Clarification Request 6:

Information dealing with possible monitoring data adjustments and uncertainties, for review of reported results/data, for internal audits of GHG project compliance with operational requirements and for corrective actions should be submitted to the validation team.

Answer:

All the information regards to possible monitoring data adjustments and uncertainties, related to GHG Project, are in compliance with all operational requirements and they were submitted to the validation team.

3.4.3 Conclusion

The validation team can not identify any risks due to inadequate management structure or quality assurance. The above mentioned requests are answered sufficiently for validation purposes. Further details to that conclusion are documented in annex 1 of that validation report.

3.5 Calculation of GHG Emissions by Source

3.5.1 Discussion

The project spatial boundary is clearly described and limited to the South-Southeast-Midwest interconnected grid subsystem. An exact and correct description of the project boundary is included in chapter B.3 of the PDD.

Details of direct and indirect emissions are discussed in the PDD in an appropriate manner. All aspects are covered by the current approach.

The calculations resulting in the final numbers have been submitted. The formulae used are correctly applied.

The calculation of the emission grid factor is based on plants´ daily dispatch information provided by ONS (National System Operator). The data used are from the years 2003, 2004 and 2005. The validation team agrees to that calculation and data basis only on the assumption that during the issuance of the Letter of Approval by the Brazilian Designated National Authority the available data basis can not be updated. In case of updated available data the appropriate emission grid factor has to be updated.

Some estimates are derived from accepted international sources, it seems reasonable to assume that they are accurate. The approach is deemed sufficient.

In the given project leakage emissions are expected not to occur.

Concluding it can be stated that the project emissions will be reduced compared to the baseline scenario by 445,961 tonnes CO2e over a crediting period of seven years, resulting in a calculated annual average of 63,709 tonnes CO2 over a crediting period of seven years.

3.5.2 Findings

Clarification Request 3:

The relevant grid, namely South-Southeast-Midwest grid should be mentioned and described as spatial boundary in Chapter B.3. as well as the spatial boundary for project activity emissions (emissions from reservoir).

Answer:

Information has been updated in the last submitted PDD.

3.5.3 Conclusion

The clarification request has been resolved and the project does comply with the requirements. Further details to that conclusion are documented in annex 1 of that validation report.

3.6 Environmental Impacts

3.6.1 Discussion

The plant has obtained preliminary, construction and operation licenses. The operation license was issued by the State Environmental Secretary SEMA (Mato Grosso). According to information given to the validation team on-site an EIA is not necessary.

Negative environmental effects are not expected to be created by the project. Given the nature of the project design this seems to be reasonable.

Transboundary effects are not expected as the project site is far from the national boundary.

As no significant environmental impacts are expected, such impacts have not influenced the project design.

3.6.2 Findings

None

3.6.3 Conclusion

The project does comply with the environmental requirements.

3.7 Comments by Local Stakeholders

3.7.1 Discussion

Local stakeholders were invited to comment on the project in accordance with the requirements of Resolution 1 of the Brazilian Interministerial Commission on Global Climate Change, the Brazilian DNA. The City Hall, the City Council, the state and municipal environmental agencies, the Brazilian forum of NGOs, the local community association and the state public attorney were invited to comment on the project. The letters sent to these local stakeholders were verified during the on-site visit. One comment of the Brazilian forum of NGOs has been received. The comment has been taken into account and answered respectively.

3.7.2 Findings

None

3.7.3 Conclusion

The project complies with the requirements. Further details to that conclusion are documented in annex 1 of that validation report

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on its website from October 11 until November 09, 2006 and invited comments within 30 days, by Parties, stakeholders and non-governmental organizations.

Published on:

http://www.netinform.de/KE/Wegweiser/Guide2.aspx?ID=2168&Ebene1_ID=26&Ebene2_ID=647&mode=1

During the commenting period there have been no comments received.

5 VALIDATION OPINION

The Certification Body ”Climate and Energy” has been ordered by Bertin Ltda. and Ecoinvest Carbon Brasil Ltda. to validate the project “Brasil Central Energia S.A. – Sacre 2 Small Hydro Power Plant Project”.

Through generation of renewable electricity from a small hydropower plant and its supply into the Brazilian South-Southeast-Midwest interconnected grid subsystem, the project results in reductions of GHG emissions that are real, measurable and give long-term benefits to the mitigation of climate change. By applying the additionality tool it is demonstrated that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

Additionally the assessment team reviewed the estimation of the projected emission reductions. TÜV SÜD can confirm that the indicated amount of emission reductions of 445,961 tonnes CO_{2e} over a crediting period of seven years, resulting in a calculated annual average of 63,709 tonnes CO_{2e} represents a reasonable estimation using the assumptions given by the project documents.

It is opinion of TÜV SÜD that the project as described in the final project design document issued on May 28, 2007 meets all relevant UNFCCC requirements for the CDM, set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board; furthermore that the project meets all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 6, May 19th,2006).

Hence, TÜV SÜD will recommend the project for registration as CDM project activity by the CDM Executive Board.

Prior to the submission of this validation report to the CDM Executive Board, TÜV SÜD will have to receive the written approval of the DNA of involved parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development. The validation is based on the information made available to TÜV SÜD and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2007/05/31

Werner Betzenbichler
Deputy head certification body
“climate and energy“

Munich, 2007/05/31

Markus Knödlseder
Project Manager

Annex 1: Validation Protocol

Table 1 Project's Environment

REQUIREMENT	REFERENCE	Comment	CONCLUSION
1. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	Brazil has ratified the Kyoto Protocol on August 23, 2002	☑
2. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	The Inter-Ministerial Commission on Global Climatic Change is the designated national authority for the CDM in Brazil.	☑
3. 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, Marrakech Accords, CDM Modalities §40a	The project will assist Brazil in archieving a sustainable development. The issuance of the LoA will demonstrate that.	☑
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved.	Kyoto Protocol Art. 12.5a, Marrakech Accords, CDM Modalities §40a	The confirmation by the host country has not been submitted to the validation team and the certification body "Climate and Energy". *Before submitting the project for registration the project owner has to provide an eligible Letter of Approval from involved Parties.*	Open issue
5. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3. A letter of approval for participants originating from Annex-I-Countries should be avail-	Kyoto Protocol Art.12.2	Yes.	☑

REQUIREMENT	REFERENCE	Comment	CONCLUSION
able.			
6. 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	Marrakech Accords, CDM Modalities, §40	A global public stakeholder process on the UNFCCC website has taken place. The PDD was open for comments from October 11 to November 09, 2006. No comments have been received.	☑
7. The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	The PDD is in conformance with the currently valid CDM Project Design Document (version 03).	☑
8. The project participants shall submit a letter on the modalities of communication (MoC) before submitting a request for registration	EB-09 F_CDM_REG form	The letter on MoC will be submitted before submitting a request for registration. *Before submitting the project for registration the project owner has to provide an eligible Letter of Approval from involved Parties.*	Open issue

Table 2 PDD

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A. General Description of Project Activity					
A.1. Project Title					
A.1.1. Does the used project title clearly enable to identify the unique CDM activity?	2	DR	Yes, the project title clearly enables to identify the unique CDM activity.	☑	☑
A.1.2. Are there an indication of a revision number and the date of the revision?	2	DR	Yes	☑	☑
A.1.3. Is this in consistency with the time line of the project's history?	2	DR	Yes	☑	☑
A.2. Description of the project activity					
A.2.1. Is the description delivering a transparent overview of the project activities?	1,2	I,DR	Principally yes. However, through the whole PDD there are given contradictonary informations whether Sacre II is a run-of-river hydro power plant or a hydro power plant with reservoir. The validation team has clearly identified during the on-site visit a run-of-river hydro power plant without reservoir. <u>Corrective Action Request 1:</u> Page 3 (line 3), page 4 (line 6), page 6 (A.4.2.), page 9 (B.3.), page 21 (Step 5), page 36 and page 38 of the PDD are mentioning Sacre II as hydro-power plant with	CAR 1	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			reservoir. Ecoinvest should correct the type of power plant to run-of-river as it has been identified on-site by the validation team.		
A.2.2. Is all information provided in compliance with actual situation or planning?	1,2	I,DR	Yes.	☑	☑
A.2.3. Are proofs available evidencing all information with relevance for the validity, for the determination of baseline and project emissions and for emission projections?	1,2	I,DR	Clarification Request 1: The description of the project activity should include the emission projection, i.e. how many tonnes CO2 the project will reduce.	CR 1	☑
A.2.4. Is all information provided in consistency with details provided by further chapters of the PDD?	1,2	I,DR	See A.2.1	See CAR 1	☑
A.3. Project Participants					
A.3.1. Is the form required for the indication of project participants correctly applied?	2	DR	Yes. The form is correctly applied.	☑	☑
A.3.2. Is the voluntary participation of all listed entities or Parties confirmed by each of them?	1,2	I,DR	Yes. The voluntary participation of all listed entities or Parties is confirmed by each of them.	☑	☑
A.3.3. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	2	DR	Yes.	☑	☑
A.4. Technical description of the project activity					
A.4.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)?	1,2	I,DR	Yes. Given GPS data in the PDD allow a clear identification of the site.	☑	☑
A.4.2. Do the project participants possess ownership	1,2,8	I,DR	Yes. Documents have been presented to	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
or licenses which will allow the implementation of the project at that site / those sites?			the validation team showing that Brasil Central Energia S.A. is allowed to implement the project at the given site.		
A.4.3. Is the category(ies) of the project activity correctly identified?	2,12	DR	The sectoral category 01 is not mentioned in the PDD under A.4.2. <u>Clarification Request 2:</u> The sectoral category 01 should be mentioned in the PDD under A.4.2.	CR 2	☑
A.4.4. Does the project design engineering reflect current good practices?	2	DR	Yes. The project design engineering reflects current good practice.	☑	☑
A.4.5. Does the description of the technology to be applied provide sufficient and transparent input to evaluate its impact on the greenhouse gas balance?	1,2,4	I,DR	Yes. The description of the technology to be applied provides a sufficient and transparent input to evaluate its impact on the greenhouse gas balance.	☑	☑
A.4.6. Is the brief explanation how the project will reduce greenhouse gas emission transparent and suitable?	1,2	I,DR	Yes. The explanation is transparent and suitable.	☑	☑
A.4.7. Is all information provided in compliance with actual situation or planning as available by the project participants?	1,2	I,DR	Yes. All information is provided in compliance with actual situation or planning.	☑	☑
A.4.8. 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?	1,2,4	I,DR	Yes. The project uses state of the art technology.	☑	☑
A.4.9. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	1,2,4	I,DR	No. The technology is not likely to be substituted by other or more efficient technologies within the project period.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.4.10. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	1,2,11	I,DR	Training was realised for the employees of operation. The employees of maintenance have sufficient experience with small hydro. Training was realised by Rosch Ingeneering.	☑	☑
A.4.11. Does the project make provisions for meeting training and maintenance needs?	1,2	I,DR	Yes. Regular training is envisaged. See also A.4.10.	☑	☑
A.4.12. Is a schedule available on the implementation of the project and are there any risks for delays?	1,2	I,DR	According to information of Ecoinvest the project start will be postponed to April 1st, 2007. <u>Corrective Action Request 2:</u> Ecoinvest has to update the PDD with the new project start of April 1st, 2007 and thus change the emission reduction calculation.	CAR 2	☑
A.4.13. Is the form required for the indication of projected emission reductions correctly applied?	2	DR	Yes. The form required for the indication of projected emission reductions is correctly applied.	☑	☑
A.5. Public Funding					
A.5.1. Is all information on public funding provided in compliance with actual situation or planning as available by the project participants?	1,2,6	I,DR	According to the information obtained by the audit team ODA does not contribute to the financing of the project	☑	☑
A.5.2. Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 2)?	2	DR	Yes.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.6. Bundling/Debundling					
A.6.1. Is all information provided that the project activity is not a debundled component of a larger project activity?	1,2	I,DR	The project activity is not a debundled component of a larger project activity.	☑	☑
B. Baseline Methodology					
B.1. Choice and Applicability					
B.1.1. Is the baseline methodology previously approved by the CDM Methodology Panel?	2,12	DR	Yes. The applied methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 6)" has been approved by the Methodology Panel on May 19th, 2006.	☑	☑
B.1.2. Is the choice of the methodology correctly justified by the PDD?	2,12	DR	Yes. The choice of the methodology is correctly justified by the PDD.	☑	☑
B.1.3. Is the baseline methodology the one deemed most applicable for this project?	2,12	DR	Yes. The methodology ACM0002 is the one deemed most applicable for this project.	☑	☑
B.1.4. Is the project in conformance with all applicability criteria of the applied methodology?	2,12	DR	Yes. The project is in conformance with all applicability criteria of the applied methodology.	☑	☑
B.2. Application of the Baseline Methodology / Identification of the Baseline Scenario					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	2,12	DR	Yes. The discussion and determination of the chosen baseline is transparent.	☑	☑
B.2.2. Does the application consider all potential base-	2,12	DR	Yes. The application considers all potential	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
line scenarios in the discussion?			baseline scenarios in the discussion.		
B.2.3. Is conservativeness addressed in the way of identifying the baseline?	2,12	DR	Yes..	☑	☑
B.2.4. Has the baseline been established on a project-specific basis?	1,2,12	I,DR	Yes.	☑	☑
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	1,2,12	I,DR	Yes.	☑	☑
B.2.6. Is the baseline determination compatible with the available data?	1,2,3,12,14,15	I,DR	Yes. The baseline determination is compatible with the available data. The calculation of the South-Southeast grid factor according to the ACM0002 is based on the years 2003, 2004 and 2005. More recent data are not available so far. The validation team, however, agrees to that calculation and data basis only on the assumption that during the issuance of the Letter of Approval by the Brazilian Designated National Authority the available data basis can not be updated. In case of updated available data the appropriate grid factor has to be updated.	☑	☑
B.2.7. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	1,2	I,DR	Yes.	☑	☑
B.2.8. Does the PDD follow the approach for identifying the baseline scenario as given by the approved methodology?	2,12	DR	Yes.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.2.9. Is all literature and sources clearly referenced?	2	DR	Yes.	☑	☑
B.3. Additionality					
B.3.1. Is the discussion of how emission reductions are archived by the project scenario in comparison to the identified project scenario provided in a transparent manner?	2,16	DR	Yes. The discussion of how emission reductions are achieved by the project scenario in comparison to the baseline scenario is provided in a transparent manner through a barrier analysis. The indicated barriers are plausible and could be partly verified on-site by the validation team.	☑	☑
B.3.2. In case of using calculation models in order to demonstrate emission reductions: Are all formulae and input data based on provable records?	2	DR	For demonstrating the additionality no computer models have been applied	☑	☑
B.3.3. Does the PDD clearly demonstrate the additionality using the approach as given by the methodology?	2,12, 16	DR	Yes. Section B.5. of the PDD is applying correctly the "Tool for the demonstration and assessment of additionality" as required in the methodology.	☑	☑
B.3.4. In case of using the additionality tool: Are all steps followed in a transparent and provable manner?	2,16	DR	Yes. All steps are followed in a transparent and provable manner.	☑	☑
B.3.5. Does the discussion sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	1,2,16	I,DR	Yes. The discussion takes into account national and/or sectoral policies, macro-economic trends and political aspirations.	☑	☑
B.3.6. Does the CDM registration have any impact on the implementation of the project?	2,6,16	DR	The CER credits are an important factor for the implementation of the project.	☑	☑
B.3.7. Is the approach for demonstrating additionality provided by the most recent (or still applicable) methodology correctly applied?	2,12, 16	DR	Yes.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.3.8. Are other proofs than anecdotal evidence for all assumptions and statements used by the additionality discussion?	2,16	DR	There are mentioned other proofs than anecdotal evidence for all assumptions and statements used by the additionality discussion.	☑	☑
B.4. Project Boundary					
B.4.1. Are all emission related to the baseline scenario clearly identified and described in a complete manner?	2	DR	Yes. Section B.3. of the PDD mentions all emissions.	☑	☑
B.4.2. In case of grid connected electricity projects: Is the relevant grid correctly identified due to the EB guidance and the underlying methodology?	1,2	I,DR	Clarification Request 3: The relevant grid, namely South-Southeast-Midwest grid should be mentioned and described as spatial boundary in Chapter B.3 as well as the spatial boundary for project activity emissions (emissions from reservoir).	CR 3	☑
B.4.3. Are all emission related to the project scenario clearly identified and described in a complete manner?	1,2	I,DR	Yes. All emission related to the project scenario are clearly identified and described in a complete manner.	☑	☑
B.4.4. Are all emission related to leakage clearly identified and described in a complete manner?	1,2	I,DR	Not applicable as leakage emissions do not have to be considered according to the methodology.	☑	☑
B.5. Detailed Baseline Information					
B.5.1. Is there any indication of a date when determine the baseline?	2	DR	It is indicated the 28th of August 2006 when it was determined the baseline.	☑	☑
B.5.2. Is this in consistency with the time line of the PDD history?	2	DR	Yes.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.5.3. Is all data required provided in a complete manner by annex 3 of the PDD?	2,3,14,15	DR	Annex 3 provides the required baseline information.	☑	☑
B.5.4. Is all data given in compliance with the methodology?	2,12	DR	Yes.	☑	☑
B.5.5. Is all data evidence by official data sources or replicable records?	2,14, 15	DR	Yes. All data is evidenced by official data sources or replicable records..	☑	☑
B.5.6. Is the vintage of the baseline data correct?	1,2,3 ,14, 15	DR	Yes. See B.2.6.	☑	☑
***C.* Duration of the Project / Crediting Period**					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	1,2	I,DR	The project´s starting date is defined for April, 01, 2007. This information has still to be updated in the PDD. See A.4.12.	See CAR 2	☑
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)?	1,2	I,DR	Yes. Section C.2	☑	☑
D. Monitoring Plan					
D.1. Monitoring Methodology					
D.1.1. Is the monitoring methodology previously approved by the CDM Methodology Panel?	11, 13, 18, 19	DR	The methodology ACM0002 (version 06) "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources" has been approved on May 19, 2006 by the	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			CDM Methodology Panel.		
D.1.2. Is the choice of the methodology correctly justified by the PDD?	2,13	DR	Yes.	☑	☑
D.1.3. Is the project in conformance with all applicability criteria of the applied methodology?	2,13	DR	The project is in conformance with all applicability criteria of the applied methodology.	☑	☑
D.1.4. Does the monitoring methodology provide a consistent approach in the context of all parameter to be monitored and further information provided by the PDD?	2,13	DR	The PDD includes the necessary parameters for the calculations.	☑	☑
D.1.5. Does the monitoring methodology apply consistently the choice of the option selected for monitoring both of project and baseline emissions?	2,13	DR	The applied and approved methodology does not specify the monitoring of project emissions.	☑	☑
D.2. Monitoring of Project Emissions (if applied)					
D.2.1. 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?	2,13	DR	The monitoring of project emissions is not explicitly required according to applied methodology.	☑	☑
D.2.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	2,13	DR	Not applicable	☑	☑
D.2.3. Will it be possible to determine the specified project GHG indicators?	2,13	DR	Not applicable	☑	☑
D.2.4. Will the indicators enable comparison of project data and performance over time?	2,13	DR	Not applicable	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.2.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	2,13	DR	Not applicable	☑	☑
D.2.6. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	2,13	DR	Not applicable	☑	☑
D.2.7. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	2,13	DR	Not applicable	☑	☑
D.2.8. Are all formulae used to determine project emission clearly indicated and in compliance with the monitoring methodology.	2,13	DR	Not applicable	☑	☑
D.3. Monitoring of Baseline Emissions (if applied)					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions of the baseline emissions during the crediting period?	2,13	DR	Yes, the monitoring plan does include all relevant parameters to determine baseline emissions. Due to the choice made regarding the monitoring approach only the relevant parameters have been selected.	☑	☑
D.3.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	2,13	DR	Yes. Due to the choice made regarding the monitoring approach only the relevant parameters have been selected.	☑	☑
D.3.3. Will it be possible to determine the specified project GHG indicators?	2,13	DR	It is possible to monitor and/or measure the currently specified GHG indicators. In case of indicators which are not measured, they	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			can be obtained from IPCC, ONS (Brazilian National Dispatch Center) and ANEEL (National Electricity acency) documents.		
D.3.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	2,13	DR	Yes. The information is sufficient to ensure the verification of a proper implementation of the monitoring plan.	☑	☑
D.3.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	2,13	DR	Yes. The information is sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records.	☑	☑
D.3.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	2,13	DR	Yes.	☑	☑
D.3.7. Are all formulas used to determine baseline emission clearly indicated and in compliance with the monitoring methodology.	2,13	DR	All formulae are clearly indicated and in compliance with the monitoring methodology.	☑	☑
D.4. Direct Monitoring of Emission Reductions (if applied)					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring directly the greenhouse gas emissions reductions during the crediting period?	2,13	DR	All relevant data necessary for estimation or measuring the GHG emission reductions are provided.	☑	☑
D.4.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	2,13	DR	Yes. Due to the choice made regarding the monitoring approach only the relevant parameters have been selected.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.4.3. Will it be possible to determine the specified project GHG indicators?	2,13	DR	Yes, it is possible to monitor and/or measure the currently specified GHG indicators. The indicators, which are not measured, can be obtained from IPCC documents, ONS (Brazilian National Dispatch Center) and ANEEL (National Electricity acency) documents..	☑	☑
D.4.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	2,13	DR	Yes.	☑	☑
D.4.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	2,13	DR	Yes.	☑	☑
D.4.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	2,13	DR	Yes.	☑	☑
D.4.7. Are all formulae used to determine project emission reductions clearly indicated and in compliance with the monitoring methodology.	2,13	DR	Yes.	☑	☑
D.5. Monitoring of Leakage (if applicable)					
D.5.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring of leakage emissions during the crediting period?	2,12, 13	DR	Not applicable as the project activity does not require a leakage calculation according to the methodology.	☑	☑
D.5.2. Are the choices of project GHG indicators rea-	--	--	Not applicable.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
sonable and in conformance with the requirements set by the approved methodology applied?					
D.5.3. Will it be possible to determine the specified project GHG indicators?	--	--	Not applicable	☑	☑
D.5.4. Is the information given for each monitoring variable by the presented table sufficient to ensure the verification of a proper implementation of the monitoring plan?	--	--	Not applicable	☑	☑
D.5.5. Is the information given for each monitoring variable by the presented table sufficient to ensure the delivery of high quality data free of potential for biases or intended or unintended changes in data records?	--	--	Not applicable	☑	☑
D.5.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	--	--	Not applicable	☑	☑
D.5.7. Are all formulas used to determine leakage emissions clearly indicated and in compliance with the monitoring methodology.	--	--	Not applicable	☑	☑
D.6. Determination of Emission Reductions					
D.6.1. Are all formulae used to determine emission reductions clearly indicated and in compliance with the monitoring methodology.	2,3, 12, 13	DR	Yes. All formulae used to determine emission reductions are clearly indicated and in compliance with the monitoring methodology.	☑	☑
D.6.2. Is the information given for each calculated variable sufficient to ensure the delivery of high quality data free of potential for biases or in-	2,3, 12,	DR	The information given for each calculated variable is sufficient to ensure the delivery of high quality data free of potential for bi-	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
tended or unintended changes in data records?	13		ases or intended or unintended changes in data records.		
D.7. Quality Control (QC) and Quality Assurance (QA) Procedures					
D.7.1. Is the selection of data undergoing quality control and quality assurance procedures complete?	2	DR	Yes.	☑	☑
D.7.2. Is the belonging determination of uncertainty levels done correctly for each ID in a correct and reliable manner?	2	DR	It is nothing said about uncertainty levels for the parameters EF_y, EG_y and m^2. Clarification Request 4: Table B.7.1. of the PDD should mention the uncertainty levels for the parameters EF_y, EG_y and m^2.	CR 4	☑
D.7.3. Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data?	2	DR	Yes. Quality control procedures and quality assurance procedures are sufficiently described to ensure the delivery of high quality data.	☑	☑
D.7.4. Is it ensured that data will be bound to national or internal reference standards?	2	DR	Yes.	☑	☑
D.7.5. Is it ensured that data provisions will be free of potential conflicts of interests resulting in a tendency of overestimating emission reductions?	2	DR	Yes.	☑	☑
D.7.6. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	1,2,11,18,19	I,DR	Yes.	☑	☑
D.7.7. Are procedures identified for training of monitoring personnel?	1,2	I,DR	The validation team was informed on-site that training has been partly realised and	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			more training is envisaged.		
D.7.8. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	2,19	DR	Clarification Request 5: There were no documented procedures to cover those situations. The operation, maintenance and emergency manual which is mentioned in Annex 4 (Monitoring Plan) should be provided to the validation team.	CR 5	☑
D.8. Monitoring Plan (Annex 4)					
D.8.1. Is the monitoring plan developed in a project specific manner clearly addressing the unique features of the CDM activity?	2,11, 18,19	DR	The monitoring plan is developed in a project specific manner clearly addressing the unique features of the CDM activity.	☑	☑
D.8.2. Does the monitoring plan completely describes all measures to be implemented for monitoring all parameter required?	2,11, 18,19	DR	Yes. The monitoring plan completely describes all measures to be implemented for monitoring all parameter required.	☑	☑
D.8.3. Does the monitoring plan completely describes all measures to be implemented for ensuring data quality of all parameter to be monitored?	2,11, 18,19	DR	The monitoring plan completely describes all measures to be implemented for ensuring data quality of all parameter to be monitored.	☑	☑
D.8.4. Does the monitoring plan provide information on monitoring equipment and respective positioning in order to safeguard a proper installation?	2,11, 18,19	DR	Yes. The monitoring plan provides information on monitoring equipment and respective positioning in order to safeguard a proper installation.	☑	☑
D.8.5. Are procedures identified for calibration of monitoring equipment?	2,11, 18,19	DR	Yes. The Monitoring Plan mentions the energy distribution company Rede Comercializadora de Energia S/A as responsible for the yearly calibration of the flow meter.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.8.6. Are procedures identified for maintenance of monitoring equipment and installations?	2,11, 18,1 9	DR	The Monitoring Plan mentions the energy distribution company Rede Comercializadora de Energia S/A as responsible party for maintenance of monitoring equipment, for dealing with possible monitoring data adjustments and uncertainties, for review of reported results/data, for internal audits of GHG project compliance with operational requirements and for corrective actions. However, how the procedures will look like, is not described in detail in the Monitoring Plan. <u>Clarification Request 6:</u> Information dealing with possible monitoring data adjustments and uncertainties, for review of reported results/data, for internal audits of GHG project compliance with operational requirements and for corrective actions should be submitted to the validation team.	CR 6	☑
D.8.7. Are procedures identified for monitoring, measurements and reporting?	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
D.8.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
D.8.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertain-	2,11, 18,1	DR	See D.9.6.	See CR 6	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
ties?	9				
D.8.10. Does the monitoring plan provide procedures identified for troubleshooting allowing redundant reconstruction of data in case of monitoring problems?	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
D.8.11. Are procedures identified for review of reported results/data?	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
D.8.12. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
D.8.13. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
D.8.14. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	2,11, 18,1 9	DR	See D.9.6.	See CR 6	☑
E. Calculation of GHG Emissions by Source					
E.1. Predicted Project GHG Emissions					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	1,2,3 ,12,1 3	I,DR	Yes. All aspects related to direct and indirect GHG emissions are captured in the project design.	☑	☑
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	1,2,3	I,DR	All GHG calculations are documented in a complete and transparent manner.	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	1,2,3	I,DR	Yes.	☑	☑
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	2,12, 13	DR	According to the methodology.	☑	☑
1.1.1 Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	--	--	There is no need for any projection.	☑	☑
E.1.5. Is the projection based on provable input parameter?	--	--	There is no need for any projection.	☑	☑
E.2. Leakage					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	---	---	Not applicable as methodology does not require the calculation of leakage.	☑	☑
E.2.2. Have these leakage effects been properly accounted for in calculations?	----	---	Not applicable	☑	☑
E.2.3. Have conservative assumptions been used to calculate leakage emissions?	-----	---	Not applicable	☑	☑
E.2.4. Are uncertainties in the leakage estimates properly addressed in the documentation?	----	---	Not applicable	☑	☑
E.2.5. Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	-----	---	Not applicable	☑	☑
E.2.6. Is the projection based on provable input parameter?	-----	---	Not applicable	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
E.3. Baseline Emissions					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	2,12	DR	Yes.	☑	☑
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	1,2	I,DR	See B.4.2.	See CR 3	☑
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	2,3	DR	Yes.	☑	☑
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	2,3	DR	Yes.	☑	☑
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	2,12, 13	DR	According to the methodology.	☑	☑
1.1.2 Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	--	--	There is no need for any projection.	☑	☑
E.3.6. Is the projection based on provable input parameter?	--	--	There is no need for any projection.	☑	☑
E.4. Emission Reductions					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	1,2	I,DR	Yes	☑	☑
E.4.2. Is the form/table required for the indication of projected emission reductions correctly applied?	2	DR	Yes.	☑	☑
E.4.3. Is the projection in line with the envisioned time	1,2	I,DR	Yes	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
schedule for the project's implementation and the indicated crediting period?					
F. Environmental Impacts					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	1,2,7	I,DR	Yes. The environmental impact is considered to be small.	☑	☑
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	1,2	I,DR	An EIA was necessary in order to obtain the environmental licenses. For the CDM project itself, no EIA is necessary. .	☑	☑
F.1.3. Will the project create any adverse environmental effects?	1,2	I,DR	No.	☑	☑
F.1.4. Are transboundary environmental impacts considered in the analysis?	1,2	I,DR	Yes.	☑	☑
F.1.5. Have identified environmental impacts been addressed in the project design?	1,2	I,DR	Yes.	☑	☑
F.1.6. Does the project comply with environmental legislation in the host country?	1,2,9	I,DR	Yes.	☑	☑
G. Stakeholder Comments					
G.1.1. Have relevant stakeholders been consulted?	1,2,10	I,DR	Yes. Relevant stakeholders have been consulted.	☑	☑
1.1.3 Have appropriate media been used to invite comments by local stakeholders?	1,2,10	I,DR	The invitations to local stakeholders were sent by postal to local stakeholders.	☑	☑
1.1.4 If a stakeholder consultation process is required	2	DR	The Brazilian DNA gives guidance how the	☑	☑

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?			local stakeholder process has to be conducted. The validation team may confirm that the process has been performed as required.		
G.1.2. Is the undertaken stakeholder process described in a complete and transparent manner?	2	DR	Yes. The undertaken stakeholder process is described in a complete and transparent manner..	☑	☑
G.1.3. Is a summary of the stakeholder comments received provided?	2	DR	No comments have been received.	☑	☑
G.1.4. Has due account been taken of any stakeholder comments received?	2	DR	No comments have been received.	☑	☑

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in tables 1 and 2	Summary of project owner response	Validation team conclusion
CARs			
Corrective Action Request 1: Page 3 (line 3), page 4 (line 6), page 6 (A.4.2.), page 9 (B.3.), page 21 (Step 5), page 36 and page 38 of the PDD are mentioning Sacre II as hydro-power plant with reservoir. Ecoinvest should correct the type of power plant to run-of-river as it has been identified on-site by the validation team.	Table 2, A.2.1.	Information has been amended in the PDD.	Issue is considered to be resolved. ☑
Corrective Action Request 2: Ecoinvest has to update the PDD with the new project start of April 1st, 2007 and thus change the emission reduction calculation.	Table 2, A.4.12.	Information has been updated in the PDD. The new project start is determined for September 14, 2006 in the updated PDD, version 3. However, the emission reduction calculation in Table 2 and Table 9 has not been adapted to the new situation.	The start of crediting period and listed emission reduction is now in PDD consistent. ☑
CRs			
Clarification Request 1: The description of the project activity should include the emission projection, i.e. how many tonnes CO2 the project will reduce.	Table 2, A.2.3.	The project activity tonnes of CO2 results are presented in A.4.4. Estimated amount of emission reductions over the chosen crediting period.	Issue is considered to be resolved. ☑
Clarification Request 2: The sectoral category 01 should be mentioned in the PDD under A.4.2.	Table 2, A.4.3.	Information has been updated in the PDD.	Issue is considered to be resolved. ☑

Clarification Request 3: The relevant grid, namely South-Southeast-Midwest grid should be mentioned and described as spatial boundary in Chapter B.3. as well as the spatial boundary for project activity emissions (emissions from reservoir).	Table 2, B.4.2.	Information has been updated in the PDD.	Issue is considered to be resolved. ☑
Clarification Request 4: Table B.7.1 of the PDD should mention the uncertainty levels for the parameters EF_y, EG_y and m^2.	Table 2, D.7.2.	Information regarding uncertainty level of the variables was included in the new version of the PDD.	Issue is considered to be resolved. ☑
Clarification Request 5: There were no documented procedures to cover those situations. The operation, maintenance and emergency manual which is mentioned in Annex 4 (Monitoring Plan) should be provided to the validation team.	Table 2, D.8.4.	Annex 4 (Monitoring Plan) has been changed. The operation maintenance and emergency manual is not mentioned anymore. Contract between Rede Comercializadora de Energia S/A that will be responsible for the operation and maintenance of Sacre 2 SHP and Sacre 2 has been submitted to the validation team.	Issue is considered to be resolved, as a document with some monitoring information were submitted to the validation team showing procedures and operation of monitoring and some risks and their mitigation and control. ☑
Clarification Request 6: Information dealing with possible monitoring data adjustments and uncertainties, for review of reported results/data, for internal audits of GHG project compliance with operational requirements and for corrective actions should be submitted to the validation team.	Table 2, D.9.6.	All the information regards to possible monitoring data adjustments and uncertainties, related to GHG Project, are in compliance with all operational requirements and they were submitted to the validation team.	The information submitted to the validation team is sufficient for validation purposes. Issue is considered to be resolved. ☑

Annex 2: Information Reference List

Reference No.	Document or Type of Information
1	On-site interview at “Brasil Central Energia S.A. - Sacre II Small Hydro Power Plant Project” by auditing team of TÜV SÜD **Validation team on-site:** Johann Thaler TÜV Industrie Service GmbH TÜV SÜD Group **Interviewed persons:** Date: 19.10.2006 Osvalter Paro Filho, Engineer in electric maintenance, Brasil Central Energia S.A. Claudio da Silva Coca, Civil Engineer, Contern Dailor Luis Romio, Environmental Coordinator, Brasil Central Energia S.A. Francisco do Espirito Santo Filho, Civil Engineer, Ecoinvest Carbon Brasil Ltda. Johann Thaler, Auditor, TÜV-Süd
2	Project Design Document “Brasil Central Energia S.A.-Sacre II Small Hydro Power Plant Project, version 01”, Ecoinvest Carbon Brasil Ltda., and September, 2006.
3	Calculation of baseline emissions, Ecoinvest Carbon Brasil Ltda., excel-files, submitted in October and December 2006.
4	Technical description of the project equipment, word-file, submitted in October 2006.
5	Power Purchase Agreement, pdf-file and Image file, submitted in November 2006.
6	Cash-Flow of the project (including the calculation of the IRR without and with CER credits), excel-file, submitted in November 2006.
7	Sacre Environmental Programs, Zip-File, submitted in November 2006.
8	ANEEL document, showing that Brasil Central Energia S.A. is the owner of the project, pdf-file, submitted in November 2006.
9	Environmental Licences: Environmental Installation and Operation Licence, submitted in November 2006.
10	Invitations to local stakeholders, zip-file, submitted in November 2006.
11	Contract between Rede Eletricidade e Servicos Ltda. e Brasil Central Energia S.A. about operation and maintenance, image file, submitted in November 2006.

Reference No.	Document or Type of Information
12	ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 6, May 19th, 2006)
13	ACM0002 “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources (Version 6, May 19th, 2006).
14	IPCC: Revised 1996 Guidelines for National Greenhouse Gas Inventories
15	IPCC: 2000, Good Practice Guidance
16	UNFCCC, CDM: Tool for the demonstration and assessment of additionality. UNFCCC, November 2005.
17	Validation and Verification Manual, IETA/World Bank (PCF), http://www.vvmanual.info
18	Document about calibration, CEMAT Rede, pdf-file, submitted in November 2006.
19	Monitoring Manual, pdf-file, submitted in November 2006.
2	Project Design Document “Brasil Central Energia S.A.-Sacre II Small Hydro Power Plant Project, version 09”, Ecoinvest Carbon Brasil Ltda.

Annex 3: Cash-Flow calculation

SACRE 2

ANNEX III
PROJECT REVENUES

Company: BRASIL CENTRAL ENERGIA S.A. Presented in R$ mil

Itens	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gross Income	**0**	**13.933**	**25.428**	**25.497**	**25.428**	**25.428**	**25.428**	**25.497**	**25.428**	**25.428**	**25.428**
Internal Sales	0	13.933	25.428	25.497	25.428	25.428	25.428	25.497	25.428	25.428	25.428
External Sales	0	0	0	0	0	0	0	0	0	0	0
(-) Taxes	**0**	**-508**	**-980**	**-1.027**	**-1.025**	**-1.025**	**-1.025**	**-1.027**	**-1.025**	**-1.025**	**-1.025**
(=) Net Operational Income	**0**	**13.425**	**24.447**	**24.470**	**24.403**	**24.403**	**24.403**	**24.470**	**24.403**	**24.403**	**24.403**
(-) Fixed Cost	0	-2.270	-9.589	-9.802	-9.991	-10.044	-10.044	-10.044	-10.044	-10.044	-10.044
(-) Variable Cost	0	-350	-640	-642	-640	-640	-640	-642	-640	-640	-640
(=) Gross Profit	**0**	**10.805**	**14.219**	**14.027**	**13.771**	**13.719**	**13.719**	**13.784**	**13.719**	**13.719**	**13.719**
(-) Operational Expenses	0	0	0	0	0	0	0	0	0	0	0
(-) Administrative Expenses	0	-43	-58	-58	-58	-58	-58	-58	-58	-58	-58
(=) Profit Before Income Tax	**0**	**10.762**	**14.161**	**13.969**	**13.714**	**13.661**	**13.661**	**13.727**	**13.661**	**13.661**	**13.661**
(-) Social Contribution	0	-100	-183	-184	-183	-183	-183	-184	-183	-183	-183
(-) Income Taxes	0	-279	-509	-510	-509	-509	-509	-510	-509	-509	-509
(=) Net Profit	**0**	**10.383**	**13.470**	**13.275**	**13.022**	**12.970**	**12.970**	**13.033**	**12.969**	**12.970**	**12.970**
(+) Depreciation/Amortization/Depletion	0	0	7.085	7.085	7.085	7.085	7.085	7.085	7.085	7.085	7.085
(-) Investments	-80.532	-22.171	0	0	0	0	0	0	0	0	0
(-) Maintenance of the Capacity	0	0	0	0	0	0	0	0	0	0	0
(+/-) Working capital	0	-1.244	-1.038	5	8	2	6	2	16	21	22
(+) Residual Value											174.283
(=) Project Cash-flow without Carbon Credits	**-80.532**	**-13.032**	**19.517**	**20.365**	**20.115**	**20.057**	**20.060**	**20.119**	**20.070**	**20.076**	**194.359**
Outflow/Inflow $ with Carbon Credits (12USD)		**-29**	**1.621**	**1.665**	**1.665**	**1.665**	**1.665**	**1.665**	**1.665**	**1.665**	**1.665**
(=) Project Cash-flow with Carbon Credits	**-80.532**	**-13.061**	**21.138**	**22.030**	**21.780**	**21.722**	**21.725**	**21.784**	**21.735**	**21.741**	**196.024**
			1,20								

With credit		22,0%

INDICATOR	
Project	
Internal Rate of Return (IRR)	**20,8%**
Net Present Value (NPV)	**61.576**
Simple Payback (SPB)	**5,7 years**
Discounted Payback (DPB)	**9 years**
Operational Margin[1]	**85,04%**
Energy generated cost (CEG) - R$/MHh	**83,64**
Leveraged Project	
Internal Rate of return (IRR)	**20,4%**
Net Present Value (NPV)	**61.493**
Simple Payback (SPB)	**5,8 years**
Shareholder	
Internal Rate of Return (IRR)	**25,5%**
Net Present Value (NPV)	**63.439**
Simple Payback (SPB)	**6,9 years**

[1] After stabilization

PARAMETER			
Return analyses	**Risk Free Rate [1]**	**Risk Premium**	**Total**
	7,46%	**4,00%**	**11,75%**
Sources Average Cost	**Value**	**Charge**	**WACC[5]**
Own Sources	**49.766**	**11,75%**	
BNDES (TJLP)[2]	**45.582**	**11,30%**	
BNDES (Cesta)[3]	**11.396**	**11,38%**	**11,52%**
FAT INTEGRAR[4]	**0**	**9,63%**	
Other Sources		**0,00%**	

[1] Geometric mean of SELIC rate (2005 to 2015)

[2] Basic *Spread* Básico+Risk *Spread*) and TJLP up to 6%

[3] (Basic *Spread* + Risk *Spread*) and (interest + income tax)

[3] (discount factor: Geometric mean of IPCA - 2005 to 2015)

[3] Weighted Average Cost of Capital

CASH-FLOWS											
Periods	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Project	**-80.532**	**-13.032**	**19.517**	**20.365**	**20.115**	**20.057**	**20.060**	**20.119**	**20.070**	**20.076**	**194.359**
	-80.532	**-93.564**	**-74.047**	**-53.682**	**-33.568**	**-13.511**	**6.549**	**26.668**	**46.739**	**66.814**	**261.173**
		0	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**
Project Discounted	**-80.532**	**-11.661**	**15.627**	**14.591**	**12.896**	**11.507**	**10.298**	**9.242**	**8.250**	**7.384**	**63.973**
	-80.532	**-92.193**	**-76.566**	**-61.975**	**-49.078**	**-37.571**	**-27.273**	**-18.031**	**-9.781**	**-2.396**	**61.576**
		0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
Cost of the generation of the electricity	**-80.532**	**-25.342**	**-4.637**	**-4.686**	**-4.682**	**-4.682**	**-4.682**	**-4.686**	**-4.682**	**-4.682**	**-4.682**
	NPV → -112.993			**PAYMENT → -19.797**							
Leveraged Project		**-14.804**	**19.517**	**20.365**	**20.115**	**20.057**	**20.060**	**20.119**	**20.070**	**20.076**	**194.359**
	-81.292	**-96.096**	**-76.579**	**-56.215**	**-36.100**	**-16.043**	**4.017**	**24.136**	**44.206**	**64.282**	**258.641**
		0	**0**	**0**	**0**	**0**	**6**	**0**	**0**	**0**	**0**
Shareholdres	**-37.399**	**-5.990**	**6.970**	**5.317**	**6.168**	**7.211**	**8.316**	**10.328**	**20.156**	**20.162**	**194.445**
	-37.399	**-43.389**	**-36.419**	**-31.102**	**-24.934**	**-17.723**	**-9.407**	**921**	**21.077**	**41.239**	**235.684**
		0	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**

BERTIN