

UK AR6 CDM Validation Report Issue 3.2 CDM.VAL1513 Effective from 01/02/2008

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VALIDATION REPORT

Lumbrás Energética S.A

Ecoinvest Carbon Brasil Ltda.

Angelina Small hydro Power Plant Project – A Brascan Energética S/A Project Activity

SGS Climate Change Programme SGS United Kingdom Ltd SGS House 217-221 London Road Camberley Surrey GU15 3EY United Kingdom



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Project Title:	
Angelina Small Hydro Power Plant Project – A Brascar	n Energética S/A Project Activity.
Organisation:	Client:
SGS United Kingdom Limited	Lumbrás Energética S.A.
	Ecoinvest Carbon Brasil Ltda.
Publication of PDD for Stakeholders Consultation	
Commenting Period:	16 Feb to 16 March 2008
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Final PDD Version and Date:	version 4, 02/04/2008

Summary:

Lumbrás Energética S.A and Ecoinvest Carbon Brasil Ltda has commissioned SGS to perform the validation of the project: Angelina Small Hydro Power Plant Project – A Brascan Energética S/A Project Activity

Methodology used: ACM0002

Version and Date: version 7, EB36

The scope of the validation 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. SGS has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The report is based on the findings of document reviews, the stakeholder consultation process and responses from the project participants to the findings raised in this report.

The report and the annexed validation describes a total of 7 (seven) findings which include:

- 2 Corrective Action Requests;
- 5 New Information Requests; and 2 observations

All findings were closed out satisfactorily. SGS's opinion to the CDM project activity recommends to the Executive Board for a request for registration. The baseline and monitoring methodology as mentioned in approved methodology adopted for the proposed project activity and meets the relevant UNFCCC requirements for the CDM and relevant host country criteria.

Subject:			
CDM Validaion			
Validation Team:			
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Abbreviations

- Approved Consolidated Methodology ACM
- Agencia Nacional de Energia Elétrica (Brazilian Agency of Power Electricity). ANEEL
- Corrective Action Request Clean Development Mechanism CAR
- CDM
- **Certified Emission Reduction** CER
- Designated National Authority Designated Operational Entity DNA
- DOE
- Emission Factor EF
- **Emissions Reduction** ER
- Monitoring Plan MP NIR
- New Information Request PDD
- Project design Document Project Participants PP
- Société Générale de Surveillance SGS



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1. Validation Opinion

SGS United Kingdom Ltd has been contracted by Lumbrás Energética S.A and Ecoinvest Carbon Brasil Ltda to perform a validation of the project: Angelina Small Hydro Power Plant Project – A Brascan Energética S/A Project Activity in Brazil.

The Validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism (CDM) and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

SGS reviewed of the project design documentation, using a risk based approach and conducted follow-up interviews.

By the installation of small hydro power plant to provide renewable electricity to the South-Southeast-Midwest interconnected grid, the project activity will result in reductions of greenhouse gas emissions that are real, measurable and give long-term benefits to the mitigation of climate change.



In our opinion, the project meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria. The project correctly applies methodology ACM0002 version 7). It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be 283.663 t of CO2e over 7 years of crediting period, averaging 40.523 t of CO2e annually. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given the underlying assumptions do not change.

The project will hence be recommended by SGS for registration with the UNFCCC.

Signed on Behalf of the Validation Body by Authorized Signatory

Signature:

Name:

Date:



2. Introduction

2.1 Objective

Lumbrás Energética S.A has commissioned SGS to perform the validation of the project: Angelina Small Hydro Power Plant Project – A Brascan Energética S/A Project Activity with regard to the relevant requirements for CDM project activities. The purpose of a validation is to have an independent third party assess 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 seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Certified Emission Reduction (CER). UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

2.2 Scope

The scope of the validation 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. SGS has 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 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.

2.3 GHG Project Description

The report summarizes the results of the validation of Angelina Small Hydro Power Plant – A Brascan Energética S/A Project Activity, performed on the basis of UNFCCC criteria. The validation has been performed as a desk review of the project documents presented by Lumbrás Energética S.A and Ecoinvest Carbon Brasil Ltda and a site visit carried out on 6 and 7th January 2008, where the details of the project activity were verified on-site. During the site visit, Lumbrás's manager and Ecoinvest consultant were interviewed.

The project activity consists of the installation of a small hydroelectric plant with an installed capacity of 25,27MW and a small reservoir of 4Km², located on the Garcia River, in the municipalities of Angelina and Major Gercino, Santa Catarina State, Brazil.

The project has the objective to provide renewable electricity from Angelina SHPP and dispatch the energy to interconnected system. This project will increase the supply of renewable source of energy to the grid, avoiding the use of fossil fuel that would be burned in thermal power.

Total amount of emission reductions estimated for the crediting period is 283.663 tCO₂e.

Baseline Scenario:

In the absence of the project activity the electricity should be generated by large hydro power and thermal generation to the grid.

With-project scenario:

The installation of a small hydroelectric plant to provide renewable electricity to the South-Southeast-Midwest interconnected system.

Leakage:

No leakage was identified for this project.



Environmental and social impacts:

The project is in line with host-country specific CDM requirements. It is expected that the project activity will help Brazil to fulfil its goals of promoting sustainable development. The contributions of the project activity for this were described in the PDD, and comprises, among others: decreasing the dependence on fossil fuels, thus improving air quality; increasing employment opportunities in the area where the project is located; promotion of better revenue distribution since it contributes to the regional/local economic development and encouraging other similar companies that want to replicate this experience.

The construction and operation of the plant have followed the legal requirements regarding environmental protection and control. During the site visit, documented evidences regarding the environmental assessments were verified, including the Environmental Report. The environmental and social impacts were identified before the installation of the project and measures have been taken to minimize these impacts.

2.4 The Names and Roles of the Validation Team Members

Name	Role	Affiliate
Fabian Gonçalves	Lead Assessor	SGS Brazil
Geisa Principe	Lead Assessor trainee	SGS Brazil



3. Methodology

3.1 Review of CDM-PDD and Additional Documentation

The validation is performed primarily as a document review of the publicly available project documents. The assessment is performed by trained assessors using a validation protocol.

A site visit is usually required to verify assumptions in the baseline.

The site visit was carried out on 6 and 7th January, 2008 in the Brascan office. The project developers were interviewed by Lead Assessor trainee.

The documents and evidences were confirmed on site visit. The results of this local assessment are summarized in ANNEX 1 to this report.

3.2 Use of the Validation Protocol

The validation protocol used for the assessment is partly based on the templates of the IETA / World Bank Validation and Verification Manual and partly on the experience of SGS with the validation of CDM projects. It serves the following purposes:

- it organises, details and clarifies the requirements the project is expected to meet; and
- it documents both how a particular requirement has been validated and the result of the validation.

The validation protocol consists of several tables. The different columns in these tables are described below.

Checklist Question	Ref ID	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements are linked to checklist questions the project should meet.	Lists any references and sources used in the validation process. Full details are provided in the table at the bottom of the checklist.	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 (Y), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). New Information Request (NIR) is used when the validation team has identified a need for further clarification.

The completed validation protocol for this project is attached as Annex A.1 to this report

3.3 Findings

As an outcome of the validation process, the team can raise different types of findings

In general, where insufficient or inaccurate information is available and clarification or new information is required the Assessor shall raise a **New Information Request (NIR)** specifying what additional information is required.

Where a non-conformance arises the Assessor shall raise a Corrective Action Request (CAR). A CAR

is issued, where:

- I. mistakes have been made with a direct influence on project results;
- II. validation protocol requirements have not been met; or
- III. there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be verified.



The validation process may be halted until this information has been made available to the assessors' satisfaction. Failure to address a NIR may result in a CAR. Information or clarifications provided as a result of an NIR may also lead to a CAR.

Observations may be raised which are for the benefit of future projects and future verification or validation actors. These have no impact upon the completion of the validation or verification activity.

Corrective Action Requests and New Information Requests are raised in the draft validation protocol and detailed in a separate form (Annex A.2). In this form, the Project Developer is given the opportunity to "close" outstanding CARs and respond to NIRs and Observations.

3.4 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment team, all documentation will be forwarded to a Technical Reviewer. The task of the Technical Reviewer is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.



4. Validation Findings

4.1 Participation Requirements

Brazil is listed as the host Party. Brazil ratified the Kyoto Protocol on 23rd August 2002. (<u>http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf</u>).

At time of the validation, no Letter of Approval from the host country had been provided. The Letter of Approval will be signed when the DNA of Brazil receive and analyse the validation report.

4.2 Project Design

The first objective of the project activity is to help Brazil to meet its raising demand for energy and to improve the supply of electricity contributing to the environmental, social and economic sustainability of the country. The project activity will reduce GHG emissions by substituting fossil fuel generated electricity by renewable energy sources.

The project design engineering reflects good practices. The project will apply the "Francis turbine". The technology employed is probably the most know option among water turbines for power generation. The project activity will be implemented in two phases.

The first phase (25MW of installed capacity) will become operational in the first half of 2009.

The second phase (1.27MW of installed capacity) will start its operational on August, 2009.

The Angelina SHPP is under construction. The equipments are not installed; however, all documents relation to technical description was verified by document review (Ref.7).

The crediting period to the project activity is of 7 years. The period starts on 10 May 2009. The operational lifetime excesses the crediting period.

The project uses the correctly PDD template (version 3). No changes in the document were occurred. The specific requirements were addressed under each header of the template.

The follow issue was raised, regarding the table for the indication of projected emission reduction:

CAR 1: The table for indication of projected emission reduction was not correctly applied. The indicated starting period was May 2009, which does not comply with the starting date of the crediting period informed in section C of the PDD.

The project participants revised the PDD (version 3), to include tables 2, 8 (ref.10) and item C.2.1.1 in accordance with starting date of the crediting period (10/05/2009) **CAR 1 was closed out**.

4.3 Eligibility as a Small Scale Project

N/A



Baseline Selection and Additionality 4.4

The methodology applied to the project activity is "ACM0002 - Approved Consolidated baseline and monitoring methodology, version 7 (EB36)."

For calculation of the Emission Factor of the grid, "Tool to calculate, scope the emission factor for an electricity system (EB35)".

For the discussion of additionality, "Tool for demonstration and assessment of additionality, version 4 (EB36)".

confirmed UNFCCC The latest approved version used were through website: http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

The methodology is applicable to the grid- connected renewable power generation project activities such as Angelina SHPP. The project activity meets all criteria of applicability: a small hydropower with a new reservoir with a power density greater than 4W/m².

The project activity is applicable under the following conditions:

- The project activity entails the installations of one small hydro power with 26,27MW of installed capacity (ref.5):
- The project activity has a new reservoir of 0.4Km², with power density of 65.67W/m².

The description of the emissions sources and gasses related to project boundary is correctly described in PDD.

The spatial extent comprises Angelina SHPP and all power plat connected to the grid S-SE-CO. The reservoir are also included in the special boundary.

No project emission was identified.

Regarding the baseline scenario and alternatives for the project activity, one clarification was requested:

NIR 2: The discussion of the identification of the most likely baseline scenario was found to be unclear. Section B.4 of the PDD presents the alternatives for the project (i.e. other investments areas of interest to the group). The information and evidence why the group decided to invest in power market (built the SHP Angelina) and not to invest in other areas should be provided.

For clarification of the NIR 2, about baseline scenario, the PP provided information about current (previous) situation of large hydropower and thermal generation in Brazil.

The most plausible baseline scenario of the project activity is the continuation of the current scenario by large hydropower that represents 75% of Brazilian's generation and 21% by thermal powers. The data sources and justifications for the baseline scenario discussed in the PDD (version 4) are satisfactory.

To discussion of the alternatives for the project activity, the Group Company provided, in ref.12, the internal benchmark company of 16% in 2007.

Confirmed that the Group Company would invest in others market such as the financial market. The Group have the internal ROA (risk profile of the investment) of 16%, it is greater than the IRR of 12.9% per year (unlevered pre-tax - ref.9).

It was justified the alternatives for the project activity presented in the PDD. The Group would be investing in others areas as financial market, and not in the power market.

The clarification provided by client is acceptable. NIR 2 was closed out.



The PDD considered the baseline scenario and demonstrated additionality using "Tool for the demonstration and assessment of additionality (version 4). The following credible scenarios were presented:

- Continuation of electricity supplied by large hydropower with reservoirs and thermal power;
- The project activity implemented without been registered as CDM.

During desk study, the following issue raised about step 1a:

CAR 3: The "Tool" version 3 is used to demonstrate additionality.

Step 1a: other realistic and credible alternative to the proposed project activity should be considered according to the Tool.

Project participant provided information about "the mission and goal" of the Brascan company. Among others things, the main mission is the generation of power energy for small hydropower (Brascan website). Through Brascan website it was verified that company have as characteristic in its business, the development, production and implementation of power energy focused in small hydroelectric.

According to the Tool (version 4), the alternatives to the project activity presented by PDD are acceptable.

It was confirmed through Brascan website, that alternative (b) of the Tool requests "other realistic and credible scenarios". However, this alternative is not applicable to the project activity because the project's owner has its business focussed on development, construction, implementation and operation of the small hydroelectric, as Angelina SHPP. **CAR 3 was closed out.**

Among other possible discussed scenarios, the selected baseline for the project activity is: In the absence of the project activity the electricity should be generated by large hydro power and thermal generation to the grid. The small hydro power plant Angelina will avoid GHG emissions for the S-SE-CO.

Considering the steps required by the "Tool for demonstration and assessment of additionality", the PDD discussed the additionality using the investment analysis (STEP2) and barriers analysis (STEP3).

Regarding the investment analysis (STEP2), **NIR 5 was raised:** To provide evidences and source of the data used to calculate the IRR. Please describe in which documents the information can be confirmed (ex. Energy tariff = PPA, etc). The company has an internal rate of return called ROA (return on assets) of 16%. To provide evidence of this value.

The financial indicator is IRR (internal rate of return) was calculate in the "Angelina cash flow" (ref.9). The cashflow shows that Angelina project activity was planned with an expected IRR of 12.9% (after tax) per year.

The company internal benchmark is the ROA (return assets). ROA is a measure used in all business (investiments, strategy, principles, prospects etc) made by company in 2007.

To close out NIR 5, evidences and sources used for calculation of IRR were provided on site visit.

As the project activity was planned before of construction date, all sources were estimated.

The "Angelina cashflow" presents the following sources:

- Total Investment: R\$ 133.961 Million (including interest tax + local tax). (See Ref.9 -const.cost.)
- Investment with interest: R\$ 123.703 (Ref.8)
- Interests tax: 9.50%
- PPA: R\$ 136,54
- ROA of 16% (Ref. 12 page 34).

All calculate, data, sources were validated. The financial analyses comply with information presented in the PDD.

From the benchmark analysis, it was demonstrated that the IRR (12.9%) of the project was lower than the company internal benchmark (16%).

The sensitivity analysis (ref.19) considered increasing in the project revenue and reduction in running costs.

Financial analyses were performed changing each of these parameters by 10% and assessing what the impact on the IRR. It was confirmed that the project IRR remained lower than benchmark even in the case where these parameters change in favour of the project activity.



To discussion of the Barrier Analysis, **NIR 4 was raised**: Barrier analysis:

Further substantiation is required regarding how the barriers prevent the implementation of this specific project activity and do not impact on the baseline. If the main argument to demonstrate the additionality of the project activity is the low IRR, this should be demonstrated using only step 2 of the additionality tool.

The PDD states that "It is important to notice that the direct comparison between the SELIC rate and the IRR is not accurate and the idea is not to introduce a benchmark analysis, but to set a parameter as a reference". In the investment analysis (step 2) a different value was used as benchmark.

The PDD states that "the region where the project is located is isolated and undeveloped. And due to that, there is a lack of infrastructure, such as roads, reliable electricity supply, communication and transports". Generally it's necessary to develop some infrastructure to implement the project, especially hydro power plants. This is a natural condition of this kind of project but not a barrier. Therefore, further clarification is required regarding lack of infrastructure as a barrier.

The institutional barrier described is of a generic nature. Further explanation and an update of circumstances are required as references are to the situation in the 90s. Regulatory uncertainty is mentioned as a barrier, since there is a new power sector regulation under development since January 2002. In addition, the overview of the Brazilian electricity market is of a generic nature and does not contribute to substantiate barriers.

Regarding Investment Barrier, the PP withdraws the comparison between SELIC and IRR because this discussion did not support the investment analysis.

The PDD stated that there is a lack of infrastructure where Angelina is being implemented. The PP could not provided evidences regarding the lack infrastructure in the region.

With regards to institutional barrier, the CCEE website evidenced high volatility of electricity price in Brazil.

The CCEE website shows the average electricity price. This website presents the electricity prices for each region of Brazil. The electricity prices of the Southern region of Brazil – where the project activity is located – were analised.

According to CCEE website, in June of 2004, the average price was of BR\$ 18.59. For year 2005, 2006 and 2007 the electricity prices were BR\$ 26.63, BR\$ 88.71 and BR\$ 50.24 respectively.

It clearly demonstrated that the approach used in the investment analysis (SELIC and IRR) is not related to the project's benchmark. The explanation presented by PP is acceptable.

Regarding institutional barrier, the evidences provided and explanation about the energy regulations are still valid.

The institutional barrier prevents the implementation of the Angelina project activity through the fragilities presented by the energy regulatory market. These fragilities related to contractual guarantees of the purchase of energy, definition of rules, energy price, penalizes etc.

NIR 4 was closed out.

Regarding the common practice further detail should be provided in accordance with the requirements of step 4 of the additionality tool. Similar project activities should be described and the differences between each of these activities and the project should be clearly indicated. **NIR 6 was raised**.

The project participants provided official information (ANEEL Agency) about similar and different project activities that are occurring in the region.

The number of small hydro powers occurring since 2005.

In the reference 12 (Official information from ANEEL) and ANEEL website, it was verified that there are 43 SHPPs that started operation since 2005 (14 receive incentives from PROINFA and 18 from CDM).

Further information about similar and differences project activities that are occurring in the region was provided.

The PDD includes a research of small hydro power plants that have started operating in 2005.

The discussion of the research made, is based on the participation of small hydro plants (maximum of installed capacity of 30MW, resolution ANEEL 652, 9/12/03) in the Brazilian Energy Market. From 43 SHPPs, 14 received incentives from PROINFA and 18 from CDM (a total of 32 projects which make up 74.4% of the SHPPs). With regards to installed potency, these 32 projects make up 90,6% of the total 520.18MW of energy produced by SHPPs.

In 2007, when Angelina project activity started operating, there were 14 SHPPs in construction. Among the 14 SHPP's, 11 have received incentives (5 from CDM and 6 from PROINFA).



In Santa Catarina, where the project activity is located, there are 8 SHPPs that started operations in 2007. From these SHPPs, 3 received incentives from PROINFA and 1 from CDM. In terms of installed capacity, 37.34% (81.96MW) are installed in Santa Catarina. Of this, 79.9% receive some kind of incentive. Therefore, it was confirmed that, without financial incentives, in Brazil SHPPs are not common practice. Instead, Large hydro power plants and thermal fossil fuel generation are common practice. **NIR 6 was close out.**

NIR 7 was raised requesting evidence and an explanation for the starting date of the project activity.

The PP provided the document "Carta Besa CWB 162/2007". It is a letter from Brascan requesting a loan from BNDES. The letter considered CDM for the project activity.

The document "Carta Besa CWB 1162/2007" (ref.8) was provided to SGS. This document is evidence that the starting date of the project activity is September 5th 2007.

NIR 7 was closed out.

4.5 Application of Baseline Methodology and Calculation of Emission Factors

The methodology "ACM0002, version 7" and "Tool to calculate the emission factor for an electricity system, EB35" were correctly used.

"The baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of the grid-connected power plants and by the addition of the new generation sources, as EFy".

BEy=EGy*EFgrid,CM,y

EFy = 0,2826 tCO2/MWh

For project activities with new reservoir, the project emissions shall be calculated.

In the case of Angelina SHPP, project emissions = zero.

Then,

PD= 26,27MW/0,4Km² = 65.67MW/Km² or 65.67W/m²

If the power density is greater than 10W/m³, the **PE =0**.

For the calculation of emission reductions, the ACM0002, version 7 and methodological tool (EB35) were correctly used.

Regarding the ER calculations:

As described in the PDD and required by ACM0002, ER = EG_yx EF

EF was calculated ex-ante, following the steps and formulas defined by ACM0002. The value obtained was 0. 0.2826 tCO2/MWh.

Net quantity is the exported energy minus the energy consumed in the auxiliary systems. All sources of data and calculations are described in Ref.10.

The calculation and related data are presented in the PDD and spreadsheet. The capacity factor (63%) was considered in the calculation of the electricity to be generated.



4.6 Application of Monitoring Methodology and Monitoring Plan

As required the ACM0002 (versio7) and Methodological Tool, the following parameters will be monitored:

- electricity supplied by the project activity to the grid;
- total electricity produced by the project activity, including the electricity supplied to the grid ad supplied to internal loads;
- installed capacity after the implementation of the project activity;
- reservoir area

The main data to be monitored for determining the emissions reductions is the net electricity generated by the plant. The emissions a reduction is reach by Appling an emission factor through the net electricity.

4.7 Choice of the Crediting Period

CAR 7 was raised requesting evidence and an explanation for the starting date of the project activity.

To close out CAR, the document " Carta BESA CWB 1162/2007" (ref.8) was provided. This document is evidence that the starting date of the project activity is September 5th, 2007.

The crediting period to the project activity is of 7 years. The period starts on 10 May 2009.

4.8 Environmental Impacts

The project has applicable environmental licenses required by the state environmental agency. Verified the Installation license n°023/07, issued by FATMA on September, 5th 2007 (ref.11a and b).

Verified the "environmental report" – Themas Engenharia, 1990, to attend the license requirements.

It is not expected any adverse environmental effects.

4.9 The project obtained the licenses required by the Brazilian environmental regulation and environmental impacts were considered by Fepam (environmental agencyLocal Stakeholder Comments

The local stakeholder consultation is required by Brazilian DNA. It is necessary to invite the relevant stakeholders, before the validation process starts. During the site visit, it was provided documented evidences indicating that consultation was carried out in November 2007. Copies of the letters sent to the stakeholders and receipts of mailing were available. The following stakeholders were invited by letters to comment on the project:

- Angelina and Major Gercino City Hall
- Municipal Assembly of Angelina and Major Gercino
- Environmental Agency of Angelina and Major Gercino
- Communitarian Association of Angelina Residents and
- Communitarian Association of Major Gercino Residents
- Santa Catarina Environmental Agency FATMA



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- State Attorney for the Public Interest of the State of Santa Catarina
- Brazilian Forum of NGOs and Social Movements for the Development and Environment

No comments were received.



5. Comments by Parties, Stakeholders and NGOs

In accordance with sub-paragraphs 40 (b) and (c) of the CDM modalities and procedures, the project design document of a proposed CDM project activity shall be made publicly available and the DOE shall invite comments on the validation requirements from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available. This chapter describes this process for this project.

5.1 Description of How and When the PDD was Made Publicly Available

The Project Design Document for this project was made available on the SGS website <u>http://cdm.unfccc.int/Projects/Validation/DB/T9YA6Y9O0FJFXCMMRWBLA4CP9VX8IH/view.html</u> and was open for comments from 16-02-2008 until 16-03-2008. Comments were invited through the UNFCCC CDM homepage

5.2 Compilation of all Comments Received

Comment Number	Date Received	Submitter	Comment
0			0

5.3 Explanation of How Comments Have Been Taken into Account

No comments were received.



6. List of Persons Interviewed

Date	Name	Position	Short Description of Subject Discussed
	Karen Nagai	Consultant - Ecoinvest	Validation process and findings.
6 and 7 January			Technical issues, operational issues, investment analysis, MONITORING plan, baseline emission factor.
2008	Julien Dominic Publio Dias	Manager - Ecoinvest	Financial issues related to the project, Environmental and quality management system; environmental impacts, Technical issues, plant operation.



7. Document References

Category 1 Documents (documents provided by the Client that relate directly to the GHG components of the project, (i.e. the CDM Project Design Document, confirmation by the host Party on contribution to sustainable development and written approval of voluntary participation from the designated national authority):

- /1/ Project Design Angelina Small Hydro Power Plant Project A Brascan Energética S/A Project Activity, version 1 – 19/10/2007, version 2 – 27/11/2007, version 3 12/02/2008, version 4 – 02-04/2008.
- /2/ Consolidated baseline methodology for grid-connected electricity generation from renewable sources – ACM 0002, version 7 – EB36.
- /3a/ Tool for the demonstration and assessment of additionality, version 4.
- /3b/ Tool to calculate the emission factor for an electricity system, version1 EB35.

Category 2 Documents (background documents used to check project assumptions and confirm the validity of information given in the Category 1 documents and in validation interviews):

- /4/ Social contract
- /5/ ANEEL license, n°3470
- /6/ Schedule of implementation (Angelina SHP)
- /7/ Engevix-Angelina_Basic project
- /8/ CDM Consideration (English and Portuguese)
- /9/ Angelina_CashFlow
- /10/ Angelina_CERs_2008 04 02
- /11a/ LAI nº 023-07 (05-09-07)
- /11b/ LAI nº 023-07 (03-09-07)
- /12/ Corporate Profile BESA_Ext Ingles_21062007 v2
- /13/ Common practice number of SHPPs

- 000 -



A.1 Annex 1: Local Assessment

This checklist is designed to provide confirmation of in-country data and information provided in the Project Design Document for Angelina Small Hydro Power Plant project – A Brascan Energética S/A Project Activity.

It serves as a "reality check" on the project that is completed by a local assessor from SGS Brazil.

Issue	Findings	Source /Means of Verification	Further action / clarification / information required?
What is the capacity factor? How was this value obtained? Please provide evidences.	The capacity factor is 63%. Engevix Angelina basic project was presented during site visit as evidence of that (Ref. 7 page 37).	Engevix Angelina -basic project, 101/US-10-RL- 0001-0A/ site visit	Ok
	Capacity factor = ensured energy (MW average) 16.64 / installed capacity (MW) 26.27 = 63%		
Confirm if Lumbrás Energética S.A is owner of Angelina SHPP.	It was confirmed through a Social Contract that Brascan Energética S.A owns 10.3% of the Angelina project and that Lumbrás Energética S.A owns 89.7%. Ref.4	Site visit/DR	Ok
Please, provide evidence that proves that CDM was considered to	During the validation assessment the document from Brascan Energética S.A, evidencing the CDM Consideration to project activity was provided.	Site visit/ DR/I	Ok
before the start of the project.	The document is a letter from Brascan to BNDES (bank) requesting the financial investment to Angelina SHP.		
	The document is attached as reference 8 (Portuguese and English).		
Verify licence from ANEEL (national	The following licenses were verified during the validation assessment:	ANEEL License, n° 3470/site visit	Ok
its installed capacity.	ANEEL License, N°3470, 23 November 2007 – Angelina basic project approval (Ref 5).		
	ANEEL License description:		
	Installed capacity of 26.27MW		
	Reservoir area of 0.40Km ²		



		1	
Verify that the project conforms with the PDD.	The project activity is located in Angelina and Major cities (27°28'S and 48°50'). The location description of the PDD corresponds to ANEEL license, N° 3470 (Ref.5).	ANEEL license, n° 3470/site visit	Ok
	The Angelina SHP is under construction.	Schedule/site	
	The project activity will be implemented in two phases. The first phase will become operational in the first half of 2009 (Ref.6). The second phase will become operational in August, 2009.	visit/l	
		Engevix Angelina	
	In the first phase, 2 turbo-generators, with a total installed capacity of 25MW, will be implemented (Ref. 7 page 9) and in the second phase, 1 turbo-generator of 1.27MW will be implemented (Ref.7 page 11).	-basic project, 101/US-10-RL- 0001-0A/ site visit	
	The following technical descriptions were confirmed through "Engevix – Angelina Basic project":		
	First phase (Ref. 7 page 14 and 15)		
	2 turbines: Francis; 12.89MW; 514.3rpm.		
	2 generators: synchronic; 13,900KVA; 13.80KV; 514.3 rpm.		
	Second phase (Ref. 7 page 15 and 16 – technical information under studying, however, the installed capacity will not be modified).		
	turbine: Francis; 1,309kW; 720rpm		
	generator: synchronic; 1,412kVA; 3.30kV; 720rpm.		
	Technical information regarding the energy metering will be available during the verification assessment.		



A.2 Annex 2: Validation Protocol

Table 1 Participation Requirements for Clean Development Mechanism (CDM) Project Activities (Ref PDD, Letters of Approval and UNFCCC website)

Conclusion	Comments	Reference	Requirement
Party, Ok August te in CDM	Brasil is listed as a non-Annex-I Party, has ratified the protocol on 23 rd August 2003 and is allowed to participate in CDM projects.	Marrakech Accords, CDM Modalities §30	 All Parties (listed in Section A3 of the PDD) have ratified the Kyoto protocol and are allowed to participate in CDM projects
ountry.pl?	http://maindb.unfccc.int/public/country.pl? country=BR		
at this Ok	No Annexure-I party is involved at this stage	Marrakech Accords, CDM Modalities §29 and §30	 The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3 and be entered into voluntarily.
Im DNA Pending	There is no letter of approval from DNA Brazil at this phase (just after submission of validation report).	Marrakech Accords, CDM Modalities §29 and §30 Kyoto Protocol Art. 12.2, Marrakech Accords, CDM Modalities	 The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof, and be entered into voluntarily
		§40a	
08 – 16 Ok alidation/D _A4CP9VX	PDD publicly available: 16 Feb 08 – 16 March 08 <u>http://cdm.unfccc.int/Projects/Validation/D</u> <u>B/T9YA6Y9O0FJFXCMMRWBLA4CP9VX</u> <u>8IH/view.html</u>	Marrakech Accords, CDM Modalities, §40	4. 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
08 – 16 <u>alidation/D</u> _A4CP9VX	of validation report). PDD publicly available: 16 Feb 08 – 16 March 08 <u>http://cdm.unfccc.int/Projects/Validation/D</u> <u>B/T9YA6Y9O0FJFXCMMRWBLA4CP9VX</u> <u>8IH/view.html</u> No comments received.	and §30 Kyoto Protocol Art. 12.2, Marrakech Accords, CDM Modalities §40a Marrakech Accords, CDM Modalities, §40	 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



	Requirement	Reference	Comments	Conclusion
5.	The project design document shall be in conformance with the UNFCCC CDM-PDD format	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	The PDD follows the CDM-PDD template version 03.	Ok
6.	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	Letter of MoC is to be provided	Pending
7.	For AR projects, the host country shall have issued a communication providing a single definition of minimum tree cover, minimum land area value and minimum tree height. Has such a letter been issued and are the definitions consistently applied throughout the PDD?		N/A	



Table 2PDD

Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
. General De	scription of Project Activity	· · · · ·				
A.1. Projec	et Title					
A.1.1.	Does the used project title clearly enable to identify the unique CDM activity?	A.1	DR	Yes, the title clearly identifies the CDM project activity. The title is "Angelina Small Hydro Power Plant Project – A Brascan Energética S/A Project Activity".	Ok	Ok
A.1.2.	Is there an indication of a revision number and the date of the revision?	A.1	DR	Validation desk study: PDD version number: 1, 19/10/2007 At the final validation: PDD version:		
A.1.3.	Is this in consistency with the time line of the project's history?	A.2	DR Ref.6	The first phase of the project will become operational in the first half of 2009. The second phase will become operational in August, 2009.	Ok	Ok
A.2. Descri	iption of the Project Activity					<u> </u>
A.2.1.	Is the description delivering a transparent overview of the project activities?	A.2	DR	The first objective of the project activity is to help Brazil to meet its raising demand for energy and to improve the supply of electricity contributing to the environmental, social and economic sustainability of the country. The PDD states clearly that the project's activity will reduce GHG emissions by substituting fossil fuel generated electricity by renewable energy sources.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.2.2.	Is all information provided in compliance with actual situation or planning?	A.2	DR Annex 1	The description of section A.2 of the PDD was cross checked with the information seen by the local assessor in the site visit.	Ok	Ok
A.2.3.	Is all information provided consistent with details provided in further chapters of the PDD?	A.2	DR	Yes.	Ok	Ok
A.3. Projec	t Participants					
A.3.1.	Is the table required for the indication of project participants correctly applied?	A.3	DR	Yes. The names and status of the participants were confirmed.	Ok	Ok
A.3.2.	Is all information provided in consistency with details provided by further chapters of the PDD (in particular annex 1)?	A.3	DR	The information provided in the Section A.3 of the PDD complies with the Annex 1.	Ok	Ok
A.4. Techn	ical 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)? Are the latitude and longitude of the site indicated (decimal points)	A.4.1.4 Ref.5	DR/sit e visit	The PDD clearly provides the location of the project activity. The location was verified through ANEEL license, n°3470 that project activity is located on Garcia River, in the cities of Angelina and major Gercino (27°28'S and 48°50'W), east of Santa Catarina, Brazil.	Ok	Ok
A.4.2.	Do the project participants possess ownership or licenses which will allow the implementation of the project at that site / those sites?	A.4.1.4 Ref.5 Ref.11 a and b	DR	The Environmental and ANEEL licenses, which give permission for project's implementation, were verified.	Ok	



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.4.3.	Is the category(ies) of the project activity correctly identified?	A.4.2 UNFC CC web site	DR	Yes, information in the PDD includes: Type: Energy and Power; Sectoral Scope: 1 – Energy industries (renewable - / non-renewable sources); Category: Renewable electricity generation for a grid (energy generation, supply, transmission and distribution).	Ok	Ok
A.4.4.	Does the project design engineering reflect current good practices?	A.4.3 Ref.6	DR/sit e visit	Yes. The project will apply the "Francis turbine". The technology employed is probably the most known option among water turbines for power generation. As informed in the PDD (pages 6-7 PDD version 4), the project activity will be implemented in two phases.	Ok	Ok
				The first phase will become operational in the first half of 2009 (Ref.6).		
				The second phase will become operation on August, 2009.		
A.4.5.	Does the description of the technology to be applied provide sufficient and transparent	A.4.3 Ref. 7	DR/sit e visit	The information on section A.2 clearly describes how the project will reduce the GHG.	Ok	Ok
	input to evaluate its impact on the greenhouse gas balance and is the			The equipments are not installed yet. The Angelina SHP is under construction.		
	greenhouse gas emission transparent and suitable?			All documents relating to technical description were verified on site visit.		
				The information presented in the PDD, section A.4.3 was confirmed (Ref. 7).		
A.4.6.	Is all information provided in compliance with actual situation or planning as available by the project participants?	A.4.3	DR	Details about the project such as location, capacity and reservoir are mentioned in the PDD and were confirmed on-site by the local assessor.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.4.7.	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?	A.4.3	DR	The technology applied by the project activity follow the common practice of its sector.	Ok	Ok
A.4.8.	Is the project technology likely to be substituted by other or more efficient technologies within the project period?	A.4.3	DR	It is not expected.	Ok	Ok
A.4.9.	Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	A.4.3 Ref.4	DR/I	Brascan Group is owner of 10.3% of Lumbrás Energética S.A (see annex 1). Brascan has extensive experience in energy sector.	Ok	Ok
				The company has been working in the electricity sector since 1998. However, no extensive training or maintenance efforts will be required.		
A.4.10	. Does the project make provisions for meeting training and maintenance needs?	A.4.3	DR/I	Please, see comments above A.4.9	Ok	Ok
A.4.11	. Is a schedule available on the implementation of the project and are there any risks for delays?	A.4.3 Ref.5 Ref.6 Ref.7 Ref.8 Ref. 11a 11b	DR/I	The chronogram of implementation (ref.6) was verified during site visit. The project will be implemented in two phases: The first phase will become operational in the first half of 2009 (Ref.6). The second phase will become operational on August, 2009. Checked: budget approved, engineering projects, and purchased orders. The installation license was issued by the environmental agency. The license for energy production was also issued by ANEEL.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
A.4.12.	Is the table required for the indication of projected emission reductions correctly applied?	A.4.4 Ref.10	DR	The table required for the indication of projected emission reductions was not correctly applied. The indicated starting period was May 2009, which does not comply with the starting date of the crediting period informed in Section C of the PDD. CAR 1 was raised . Table 1 in the revised PDD is now complying with the starting date of the crediting period (10/05/2009). CAR 1 was closed out .	CAR 1	Ok
A.5. Public	Funding					
A.5.1.	Does the information on public funding provided conform with the actual situation or planning as presented by the project participants?	Ref. 8	DR	Yes. The project will be partially financed by the owner and the other part will be financed by a Brazilian financial entity. There are no foreign donors for the project.	Ok	Ok
A.5.2.	Is all information provided consist with details	A.4.5	DR	No.	Ok	Ok
	provided by further chapters of the PDD (in particular annex 2)?	Annex 2				
A.5.3.	In case of public funding from Annex I Parties is it confirmed that such funding does not result in a diversion of official development assistance	A.4.5 Annex	DR	No ODA funding has been provided for this project. The Project will be financed by BNDES - <u>Banco</u> <u>Nacional de Desenvolvimento Econômico e</u> <u>Social</u> (Brazilian Development Bank).	Ok	Ok



	Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl		
B. Bas	. Baseline and Monitoring Methodology								
B.1	. Choice	e and Applicability							
	B.1.1.	Is the baseline methodology previously	B.1	DR	Yes. Methodologies used are:	Ok	Ok		
	approved by the CDM Methodology Panel?	ACM0 002,		"Approved Consolidated baseline and monitoring methodology ACM0002, version 7".					
		versio		The tool used was:					
		EB36		"Tool to calculate the emission factor for an electricity system (EB35)".					
			Tool (EB35)		The methodology and tool are current.				
	B.1.2. Is the baseline methodology the one deemed most applicable for this project?	B.2 ACM 0002,	DR	Yes. The methodology is applicable to grid- connected renewable power generation project activities such as Angelina SHPP.	Ok	Ok			
			versio n 7		The project activity meets all criteria of applicability: a small hydropower with new reservoir with a power density greater than 4W/m ² .				



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.1.3.	Is the choice of the methodology correctly justified by the PDD and is the project in conformance with all applicability criteria of the applied methodology?	B.2 AMC0 002, versio n 7 Ref.5	DR	 The following criteria of applicability was discussed in the PDD (page 8) and verified on site visit: The project activity entails the installation of one small hydro power with 26,27MW of installed capacity (ANEEL License, n°3470, 23/11/07). The project activity has a new reservoir of 0.4Km², with power density of 65.67W/m², so the power density is greater than 4W/m² (ANEEL license, n° 3470, 23/11/07). 	Ok	Ok
B.2. Proje	ct Boundary					
B.2.1.	Are all emission sources and gasses related to the baseline scenario, project scenario and leakage clearly identified and described in a complete manner?	B.3 ACM0 002, versio n 7	DR	The project boundary is correctly described in the PDD.	Ok	ОК
		nes				
B.2.2.	In case of grid connected electricity projects: Is the relevant grid correctly identified in accordance with EB guidance and the underlying methodology?	B.3 ACM0 002, versio n 7 Ref.9	DR	The S_SE_CO Brazilian grid was correctly identified and in accordance with EB guidance and methodology.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.2.3.	Are the project's spatial boundaries (geographical) and the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	B.3 ACM0 00, versio n 7	DR	Yes. The spatial extent comprises Angelina SHPP and all power plant connected to the Grid S-SE-CO. The reservoir area is also included in the special boundary.	Ok	Ok
B.3. Identi	fication of the Baseline Scenario					
B.3.1.	Does the PDD discuss the identification of the most likely baseline scenario? Does the PDD follow the steps to determine the baseline scenario required by the methodology and is the application of the methodology and the discussion and determination of the chosen baseline transparent?	B.4 Ref. 9 Ref.12	DR	The discussion of the identification of the most likely baseline scenario was found to be unclear. Section B.4 of the PDD presents the alternatives for the project (i.e. other investments areas of interest to the group). The information and evidence why the group decided to invest in power market (built the SHP Angelina) and not to invest in other areas should be provided. NIR 2 was raised. The most plausible baseline scenario of the project activity is the continuation of the current scenario by large hydropower that represents 75% of Brazilian's generation and 21% by thermal powers. The data sources and justifications for the baseline scenario discussed in the PDD (version 4) are satisfactory. Regarding alternatives for the project activity presented in the PDD, the Group would be investing in others areas as financial market, and not in the power market. The clarification provided by client is acceptable. NIR 2 was closed out.	NIR 2	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl				
B.3.2.	Does the application consider all potential realistic and credible baseline scenarios in the discussion taking into account relevant national and/or sectoral policies, macro- economic trends and political aspirations??	B.4 B.5	DR	 The following credible scenario were presented: continuation of electricity supplied by large hydropower with reservoirs and thermal power; the project activity implemented without been registered as CDM. 	Ok	Ok				
B.3.3.	Is the choice of the baseline compatible with the available data?	B.4 B.5	DR	Yes.	Ok	Ok				
B.3.4.	Is conservativeness addressed in the way of identifying the baseline?	B.4	DR	See NIR 2.	NIR 2	Ok				
B.3.5.	Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	B.4	DR	In the absence of the project activity the electricity should be generated by large hydro power and thermal generation to the grid. The small hydro power plant Angelina will avoid GHG emissions for the S-SE-CO.	Ok	Ok				
B.4. Additi	B.4. Additionality									
B.4.1.	Does the PDD clearly demonstrate the additionality using the approach as given by the methodology and by following all the required steps?	B.5	DR	See item 4.2	Ok	Ok				



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.2.	In case of using the additionality tool: Is the 'Additionality Tool' used in the PDD latest version? If an earlier version has been used, do the changes impact the discussion in the PDD? Are all steps followed in a transparent manner?	B.5 Brasca n web site <u>http://</u> www.b rascan <u>energe</u> <u>tica.co</u> <u>m.br/e</u> <u>mpres</u> <u>a/miss</u> <u>a0.htm</u>	DR	The "Tool" version 3 is used to demonstrate additionality. Step 1a: other realistic and credible alternative to the proposed project activity should be considered according to the Tool. CAR 3 was raised. According to the Tool (version 4), the alternatives to the project activity presented by PDD are acceptable. It was confirmed through Brascan website, that alternative (b) of the Tool requests "other realistic and credible scenarios". However, this alternative is not applicable to the project activity because the project's owner has its business focussed on development, construction, implementation and operation of the small hydroelectric, as Angelina SHPP. CAR 3 was closed out .	CAR 3	Ok
B.4.3.	Is the discussion on additionality and the evidence provided consistent with the starting date of the project If the project has started before the validation is it discussed how the CDM was taken into account in the decision to go ahead with the project activity	C.1.1 Ref. 8	DR	To provide evidence and an explanation for the starting date of the project activity: 01/09/2007. NIR 7 was raised . The document "Carta Besa CWB 1162/2007" (ref.8) was provided to SGS. This document is evidence that the starting date of the project activity is September 5 th 2007. . NIR 7 was closed out .	NIR 7	Ok
B.4.4.	Is the discussion on additionality consistent with the identification all potential realistic and credible baseline scenarios	B.5	DR	See CAR 3, NIR 4, NIR 5, NIR 6, NIR7	CAR 3 NIR 4 NIR5 NIR6 NIR7	Ok



Checklist	Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.5. Do tec	o the identified alternative include chnologies and practices that include	A.2 Ref.5	DR	The information on section A.2 clearly describes how the project will reduce the GHG.	Ok	Ok
out wit	with the proposed CDM project activity			Transparent inputs of technical description to be checked by the local assessor in the site visit. Checked evidence of the reservoir area: 0,4Km ²		
				installed capacity of the plant: 26,27MW		
				First phase (Ref. 7 page 14 and 15)		
				2 turbines: Francis; 12.89MW; 514.3rpm.		
				2 generators: synchronic; 13,900KVA; 13.80KV; 514.3 rpm.		
				Second phase (Ref. 7 page 15 and 16 – technical information under studying, however, the installed capacity will not be modified).		
				turbine: Francis; 1,309kW; 720rpm		
				generator: synchronic; 1,412kVA; 3.30kV; 720rpm.		



B.4.6. If an investmer it been shown	t analysis has been used, has B. hat the proposed project Ref	B.5 DF	To provide evidences and source of the data		
activity is econ attractive than without the rev	Ref.	Ref.8 .ef.10	 used to calculate the IRR. Please describe in which documents the information can be confirmed (ex. Energy tariff = PPA, etc). The company has an internal rate of return called ROA (return on assets) of 16%. To provide evidence of this value. NIR 5 was raised. Evidences and sources used for calculation of IRR were provided on site visit. As the project activity was planned before of construction date, all sources were estimated. The "Angelina cashflow" presents the following sources: Total Investment : R\$ 133.961 Million (including interest tax + local tax). (See Ref.9 - const.cost.) Investment with interest: R\$ 123.703 (Ref.8) Interests tax: 9.50% PPA: R\$ 136,54 ROA of 16% (Ref. 10 – page 34). All calculate, data, sources were validated. The financial analyses comply with information presented in the PDD. NIR 5 was closed out. 	NIR 5	Ok



	Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
* MoV	B.4.7. If a barrier analysis has been used, has it been shown that the proposed project activity faces barriers that prevent the implementation of this type of proposed project activity but would not have prevented the implementation of at least one of the alternatives?	B.5	DR	Barrier analysis: Further substantiation is required regarding how the barriers prevent the implementation of this specific project activity and do not impact on the baseline. If the main argument to demonstrate the additionality of the project activity is the low IRR, this should be demonstrated using only step 2 of the additionality tool. The PDD states that "It is important to notice that the direct comparison between the SELIC rate and the IRR is not accurate and the idea is not to introduce a benchmark analysis, but to set a parameter as a reference". In the investment analysis (step 2) a different value was used as benchmark. The PDD states that "the region where the project is located is isolated and undeveloped. And due to that, there is a lack of infrastructure, such as roads, reliable electricity supply, communication and transports". Generally it's necessary to develop some infrastructure to implement the project, especially hydro power plants. This is a natural condition of this kind of project but not a barrier. Therefore, further clarification is required regarding lack of infrastructure as a barrier.	NIR 4	Ok
1010 0						aye 50/00



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.7 Continued			The institutional barrier described is of a generic nature. Further explanation and an update of circumstances are required as references are to the situation in the 90s. Regulatory uncertainty is mentioned as a barrier, since there is a new power sector regulation under development since January 2002. In addition, the overview of the Brazilian electricity market is of a generic nature and does not contribute to substantiate barriers. NIR 4 was raised. It clearly demonstrated that the approach used in the investment analysis (SELIC and IRR) is not related to the project's benchmark. The explanation presented by PP is acceptable. Regarding institutional barrier, the evidences provided and explanation about the energy regulations are still valid. The institutional barrier prevents the implementation of the Angelina project activity through the fragilities presented by the energy regulatory market. These fragilities related to contractual guarantees of the purchase of energy, definition of rules, energy price, penalizes etc. NIR 4 was closed out.		



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.8. Has it been shown that the proceeding of the process of the	oject is not B.5 Ref.12	DR	Regarding the common practice further detail should be provided in accordance with the requirements of step 4 of the additionality tool. Similar project activities should be described and the differences between each of these activities and the project should be clearly indicated. NIR 6 was raised. Further information about similar and differences project activities that are occurring in the region was provided. The PDD includes a research of small hydro power plants that have started operating in 2005. The discussion of the research made, is based on the participation of small hydro plants (maximum of installed capacity of 30MW, resolution ANEEL 652, 9/12/03) in the Brazilian Energy Market. From 43 SHPPs, 14 received incentives from PROINFA and 18 from CDM (a total of 32 projects which make up 74.4% of the SHPPs). With regards to installed potency, these 32 projects make up 90,6% of the total 520.18MW of energy produced by SHPPs. In 2007, when Angelina project activity started operating, there were 14 SHPPs in construction. Among the 14 SHPP's, 11 have received incentives (5 from CDM and 6 from PROINFA). In Santa Catarina, where the project activity is located, there are 8 SHPPs that started operations in 2007. From these SHPPs, 3 received incentives from PROINFA and 1 from CDM. In terms of installed capacity, 37.34% (81.96MW) are installed in Santa Catarina. Of this, 79.9% receive some kind of incentive.	NIR6	Ok



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.4.8. Continued			Therefore, it was confirmed that, without financial incentives, in Brazil SHPPs are not common practice. Instead, Large hydro power plants and thermal fossil fuel generation are common practice. NIR 6 was closed .		
B.4.9. Is it demonstrated/justified that the project	B.5	DR	See NIR 2, NIR6	NIR 2	Ok
activity itself is not a likely baseline scenario			During validation assessment were confirmed:	NIR 6	
			- It was confirmed that the project is not the most attractive investment if compared with the internal benchmark of the company.		
			- the generation of electricity by SHPP without financial incentives is not a common practice in the region where the project is installed.		
			Considering both the investment analysis and barriers analysis, it was concluded that the project is additional (is not itself a baseline scenario).		
B.5. Application of the Baseline Methodology					
B.5.1. Has the approved methodology been applied correctly for determining baseline emissions?	B.6 ACM0 002, versio	DR	Yes. The methodology "ACM0002, version 7" and "Tool to calculate the emission factor for an electricity system, EB35" were correctly used. "The baseline scenario is electricity delivered to	Ok	Ok
	n 7		the grid by the project activity would have		
	Tool for EF		the grid-connected power plants and by the addition of the new generation sources, as EFv".		
	Ref. 9		BEy=EGy*EFgrid,CM,y		
	Ref.10		EFy = 0,2826 tCO2/MWh.		



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.5.2. Has the approved methodology been	applied B.6.1	DR	Yes.	Ok	Ok
correctly for determining project emis	B.6.3 ACM0 00,ver sion 7 Ref.10		For project activities with new reservoir, the project emissions shall be calculated. In the case of Angelina SHPP, project emissions = zero. Then, PD= 26,27MW/0,4Km ² = 65.67MW/Km ² or 65.67W/m ² If the power density is greater than 10W/m ³ , the PE =0.		
B.5.3. Has the approved methodology been correctly for determining leakage ?	applied B.6.1 B.6.3 ACM0 002	DR	No leakage was considered. LE=0.	Ok	Ok
	versio n, 7				



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.5.4. Where applicable, has the approved methodology been applied correctly for the direct calculation of emission reductions	B.6.1 B.6.3 ACM0 003 Metho dologi cal Tool Ref.10	DR	For the calculation of emission reductions, the ACM0002, version 7 and methodological tool (EB35) were correctly used. Regarding the ER calculations: As described in the PDD and required by ACM0002, ER = EG _y x EF EF was calculated ex-ante, following the steps and formulas defined by ACM0002. The value obtained was 0. 0.2826 tCO2/MWh. Net quantity is the exported energy minus the energy consumed in the auxiliary systems. All sources of data and calculations are described in Ref.10.	Ok	Ok
B.5.5. Have all the methodological choices been explained, have they been properly justified and are they correct	B.6.1 B.6.3 ACM0 002, versio n 7 Metho dologi cal tool (EB35) Ref.10	DR	The baseline emission factor follows the ACM0002 version 07 and methodological tool (EB35). Method used: The calculation and related data are presented in the PDD and spreadsheet.	Ok	Ok



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.5.6. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	B.6.1 B.6.3 Ref.10	DR	Yes, the capacity factor (63%) was considered in the calculation of the electricity to be generated. The uncertainties (hydrological or operational problems) are considered in the capacity factor defined.	Ok	Ok



Checkl	ist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.6. Ex-ante	e Data and Parameters Used					
B.6.1.	Are the data provided in compliance with the methodology?	B.6.2 ACM0 002, versio n 7 Metho dologi cal tool (EB35) Ref.5 Ref.9	DR	 The ex-ante parameters mentioned in the PDD are in compliance with the Methodology. Parameters ex-ante: EFy,- CO2 emission factor of the grid, EFOM,y - CO2 operating margin emission factor of the grid EFBM,y - CO2 build margin emission factor of the grid EFBM,y - CO2 build margin emission factor of the grid Fraction of time during which low-cost/must-run sources are on the margin Fi,y - mass of volume GEN,j/kn/y - electricity generation of each power plant GEJj,k,ll,y- electricity imports quantity to the project electricity system COEFi,j,y - CO2 emission coefficient of fuels used in connected electricity system COEFi,j,y - CO2 emission coefficient of each fuel type Installed capacity of 25,27MW Reservoir area of 4Km² 	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.6.2.	Is all the data derived from official data sources or replicable records and have these been correctly quoted?	Ref.11 a,b Ref.5 Ref.9	DR	All data are derived from official sources, as per environmental license ref.11a and b and ANNEL license ref.5. Data used in the calculation of the Emission factor are from official sources.	Ok	Ok
B.6.3.	Is the vintage of the baseline data correct?			See item B.6.3	Ok	Ok
B.7. Calcul	ation of Emissions Reductions					
B.7.1.	Has the approved methodology been applied correctly for determining emission reductions ?	B.6.1 B.6.2 B.3 ACM0 002, versio n 7 Metho dologi cal tool (EB35) Ref.9 Ref.10	DR	Yes, as described in the PDD and required by ACM0002, ER = EG _y x EF See also comments under B.5.4 and comments about EF in the section B.6 above.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.7.2.	Are the emission reduction calculations documented in a complete and transparent manner?	B.6.1 B.6.2 ACM0 002, versio n 7 Metho dologi cal tool (EB35) Ref.9 Ref.10	DR	Yes, it was clearly documented in the PDD and a spreadsheet with data and formula was provided during the validation.	Ok	Ok
B.7.3.	Have conservative assumptions been used to calculate emission reductions?	B.6.2 B.6.3 Ref.9	DR	Yes. The data used for emission factor calculations were from official sources.	Ok	Ok
B.7.4.	Is the projection based on provable input parameter?	B.6.3 Ref.9	DR	Yes, see section B.6	Ok	Ok
B.7.5.	Is the projection based on same procedures as used for later monitoring or acceptable alternative models?	B.3	DR	Yes, the same procedure to calculate the estimate emissions reduction and emission factor of the grid will be used during monitoring period.	Ok	Ok
B.7.6.	Is the calculation of the emission reduction correct?	B.3	DR	Formulas to calculate emissions and emission reductions checked.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.8. Emiss	ion Reductions					
B.8.1.	Will the project result in fewer GHG emissions than the baseline scenario?	B.6.3	DR	Yes, emissions reductions are achieved by the total net electricity generated and delivered to the grid.	Ok	Ok
B.8.2.	Is the form/table required for the indication of projected emission reductions correctly applied?	B.6.4	DR	Yes, follows the correct form/table.	Ok	Ok
B.8.3.	Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period?	B.6.3	DR	Yes.	Ok	Ok
B.9. Monito	oring Methodology					
B.9.1.	Does the monitoring methodology provide a consistent approach in the context of all parameter to be monitored and further information provided by the PDD? Are all parameters and data that is available at validation consistent with the approved	B.7 Annex 4	DR	Yes. The monitoring plan provided follows the requirements of ACM0002 version 7 and methodological tool (EB35).	ok	Ok
	methodology					
B.9.2.	Does the monitoring methodology apply consistently the choice of the option selected for monitoring both of project and baseline emissions?	B.7.1 Annex Ref.9	DR	Yes, specifically in this project the PE is zero and the baseline emission is the grid emission factor. The EF is correctly applied and follows the ACM0002 version 7.	Ok	Ok



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.10. Data and Parameters Monitored					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period?	B.7.1	DR	Yes, monitoring plan provide the applicable parameter (Electric energy Generated (EGy).	Ok	Ok
B.10.2. Are the choices of project GHG indicators reasonable and in conformance with the requirements set by the approved methodology applied?	B.7.1	DR	Yes, indicator in conformance with the requirements of ACM0002 version 7.	Ok	Ok
B.10.3. Will it be possible to determine the specified project GHG indicators?	B.7.1	DR	All monitored data could be cross checked with official sources.	Ok	Ok
			The internal control (by project sponsor) and electricity purchase or evidences from CCEE will used as source data for the monitoring.		
B.10.4. 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?	B.7.1	DR	Yes.	Ok	Ok
B.10.5. 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?	B.7.1	DR	The information provided describes properly the implementation of the monitoring plan.	Ok	Ok
B.10.6. Is the monitoring approach in line with current good practice, i.e. will it deliver data in a reliable and reasonably acceptable accuracy?	B.7.1	DR	The electricity generated will be monitored by the project (internal monthly report) and it will be checked by reports emitted by CCEE (official source).	Ok	Ok



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.10.7. Are all formulae used to determine project emission clearly indicated and in compliance with the monitoring methodology.	B.7.1	DR	As verified during site visit, the monitoring approach is in line with current good practice for the energy sector in the country (following ONS procedures).	Ok	Ok
B.11. Quality Control (QC) and Quality Assurance (QA) Proc	edures			
B.11.1. Is the selection of data undergoing quality control and quality assurance procedures complete?	B.7.1 Annex 4	DR	Yes, the level of uncertainty is low because the data related to the emission factor comes from official source.	Ok	Ok
			The electricity energy generated can be cross checked with official source.		
B.11.2. Is the belonging determination of uncertainty levels done correctly for each ID in a correct and reliable manner?	B.7.1 Annex 4	DR	Yes, see B.11.1	Ok	Ok
B.11.3. Are quality control procedures and quality assurance procedures sufficiently described to ensure the delivery of high quality data?	B.7.1 Annex 4	DR	The monitoring plan includes the operations of all data, data analysis and data compilation systems to be employed by the project participants.	Ok	Ok
B.11.4. Is it ensured that data will be bound to national or internal reference standards?	B.7.1 Annex 4	DR	Yes. The monitoring data can be compared with official source.	Ok	Ok
B.11.5. Is it ensured that data provisions will be free of potential conflicts of interests resulting in a tendency of overestimating emission reductions?	B.7.1 Annex 4	DR	Yes. The electricity energy generated is controlled by third party. The electricity delivered to the grid is available and will be controlled by governmental agency.	Ok	Ok



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.12. Operational and Management Structure					
B.12.1. Is the authority and responsibility of project management clearly described?	B.7.1 Annex	DR/I	The structure (authority and responsibility) is defined and described in the PDD.	Ok	Ok
	4 Ref.13		calibration and maintenance of the monitoring equipments.		
			Brascan will be responsible for the project management, for training of the staff, measurement, for preparing of an operation, maintenance and emergency manual.		
B.12.2. Is the authority and responsibility for	B.7.1	DR/ I	See B.12.1	Ok	Ok
registration, monitoring, measurement and reporting clearly described?	Annex 4				
	Ref.13				
B.12.3. Are procedures identified for training of	B.7.1	DR/I	The project is not implemented.	Ok	Ok
monitoring personnei?	Annex 4		The training of the staff for the monitoring will be carried out before of the start-up.		



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
B.13. Monitoring Plan (Annex 4)					
B.13.1. Is the monitoring plan developed in a project specific manner clearly addressing the unique features of the CDM activity?	Annex 4 Ref.13 Ref.14	DR	Yes, the monitoring plan explains about the energy measurement process. Verified the procedure to collect the generation data of the Brascan Energética S.A (for other CDM projects – ref.13), the same procedure will be adopted for Angelina SHPP. According to monitoring, the project will follow the CCEE procedure. Measurements will be controlled in real time by	Ok	Ok
			the Operation and Management System Center (COGS) – Brascan, in Curitiba		
B.13.2. Does the monitoring plan completely describes all measures to be implemented for monitoring all parameter required, including measures to be implemented for ensuring data quality?	Annex 4	DR	See item B.13.1. The energy generated will be controlled internally and by third party (CCEE	Ok	Ok
B.13.3. Does the monitoring plan provide information on monitoring equipment and respective positioning in order to safeguard a proper installation?	Annex 4	DR	See item B.13.1	Ok	Ok
B.13.4. Are procedures identified for calibration of monitoring equipment?	Annex 4	DR	The project will follow the National System Operator procedure (ONS – modulo 12).	Ok	Ok
	Ref.13		The energy metering (principal and backup) will be calibrated each two years.		
B.13.5. Are procedures identified for maintenance of monitoring equipment and installations?	Annex 4	DR	See item B.12.1	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl	
B.13.6	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	Annex 4 Ref.14	DR/I	All the monitoring parameters will be archived for two years from the end of the crediting period.	Ok	Ok	
B.13.7	Are procedures identified for dealing with possible monitoring data adjustments and missing data allowing redundant reconstruction of data in case of monitoring problems??	Annex 4 Ref.14	DR	See item B.13.1	Ok	Ok	
B.13.8.	Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	Annex 4	DR	See item B.12.1	Ok	Ok	
		Ref.13					
		Ref.14					
B.13.9.	Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	Annex 4	DR	See item 13.1	Ok	Ok	
B.14. I	Baseline Details						
B.14.1.	Is there any indication of a date when	C.1.1	DR	Informed in the PDD as 05/09/2007	Ok	Ok	
	determine the baseline?	Ref.8					
B.14.2.	Is this in consistency with the time line of the PDD history?	C.1.1	DR	Yes.	Ok	Ok	
B.14.3.	Is all data required provided in a complete manner by annex 3 of the PDD?	Annex 3 Ref. 16	DR	Yes, the information is provided of the emission factor (from official source), used the build margin and operating margin calculation of 2004 – 2006. The data is used correctly being the last updated value.	Ok	Ok	



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
C. Duration of the Project / Crediting Period					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	C.1.1 Ref.8	DR	To provide evidence and an explanation for the starting date of the project activity: 01/09/2007. NIR 7 was raised . The document "Carta Besa CWB 1162/2007" (ref.8) was provided to SGS. This document is evidence that the starting date of the project activity is September 5 th 2007. . NIR 7 was closed out .	NIR 7	Ok
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)?	C.2.1	DR	Yes, renewable crediting period of max 7 years. See CAR 1 Starting date: 10/05/2009	CAR 1	Ok
C.1.3. Does the project's operational lifetime exceed the crediting period	C.2.1	DR	No.	Ok	Ok
D. Environmental Impacts					
D.1.1. Does the project comply with environmental legislation in the host country?	D.1 D.2 Ref. 11a And 11b	DR	Yes. On site visit was presented the installation license, n°023/07 issued by Fundação do Meio Ambiente (FATMA) on 3 and 5 September 2007 (valid per 24 months). The Installation license gives the permission to the implementation of the Angelina SHPP. The project activity complies with environmental legislation in Brazil.	Ok	Ok



Check	list Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
D.1.2.	Has an analysis of the environmental impacts of the project activity been sufficiently described?	D.1 D.2 Ref. 11a 11b	DR	Environmental impacts were considered by the environmental agency when issuing applicable licenses.	Ok	Ok
D.1.3.	Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	D.1 D.2 Ref. 11a 11b	DR	Yes, the environmental agency required the environmental impact assessment in order to issue the installation license.	Ok	Ok
D.1.4.	Will the project create any adverse environmental effects?	D.1 D.2 Ref. 11a 11b	DR	It is not expected any adverse environmental effects. Verified the "environmental report " – Themas Engenharia, 1990, to attend the license requirements.	Ok	ok
D.1.5.	Are transboundary environmental impacts considered in the analysis?	D.1 D.2 Ref. 11a 11b	DR	DR Transboundary environmental impact was considered in the licensing process.		Ok
D.1.6.	Have identified environmental impacts been addressed in the project design?	D.1 D.2 Ref. 11a 11b	DR	The project obtained the licenses required by the Brazilian environmental regulation and environmental impacts were considered by FATMA (environmental agency).	Ok	Ok



Checklist Question	Ref. ID	MoV*	Comments	Draft Concl	Final Concl
E. Stakeholder Comments					
E.1.1. Have relevant stakeholders been consulted?	E	DR	Yes, as listed in the PDD, section E and verified	Ok	Ok
	Ref.17		during the validation assessment.		
	Re.18				
E.1.2. Have appropriate media been used to invite	E	DR	Verify language and information used in the	Ok	Ok
comments by local stakeholders?	Ref.17		consultation process.		
	Re.18		Letters sent to stakeholders were verified. They are prepared in local language.		
E.1.3. If a stakeholder consultation process is	E	DR	Yes, the stakeholder consultation process follow	Ok	Ok
country, has the stakeholder consultation	Ref.17		the Brazilian DNA Resolution No. 1, issued on September 11th 2003		
process been carried out in accordance with such regulations/laws?	Re.18				
E.1.4. Is the undertaken stakeholder process	E	DR	Yes, copy of the letters and delivery receipts	Ok	Ok
manner?	Ref.17		were provided.		
	Re.18		The letters were sent in November 2007.		
E.1.5. Is a summary of the stakeholder comments	Е	DR Yes, no comments received.		Ok	Ok
received provided?	Ref.17				
	Re.18				
E.1.6. Has due account been taken of any	E	DR	Yes, no comments received.	Ok	Ok
stakeholder comments received?	Ref.17				
	Re.18				



References

Reference ID	Title / Description	Comments
/1/	Project Design – Angelina Small Hydro Power Plant Project – A Brascan Energética S/A project Activity, version 1 – 19/10/2007, version 2 – 27/11/2007, version 3 – 12/02/2008, version 4 – 02/04/2008.	
/2/	Consolidated baseline methodology for grid- connected electricity generation from renewable sources – ACM 0002, version 7 – EB36.	
/3a/	Tool for demonstration and assessment of additionality, version 4 (EB36)	
/3b/	Tool to calculate the emission factor an electricity system, version1 (EB35)	
/4/	Social contract	Contract social between Brascan and Lumbrás Energética S.A
/5/	ANEEL license, n°3470	
/6/	Schedule of implementation (Angelina SHPP)	
/7/	Engevix-Angelina_Basic project	Technical description of the project.
/8/	CDM Consideration (English and Portuguese)	
/9/	Angelina Cash_flow	Investment analyses
/10/	Angelina CERs_2008 04 02	CERs worksheet
/11a/	LAI n°032-07 (05-09-07)	Installation license
/11b/	LAI n°023-07 (03-09-07)	Installation license
/12/	Corporate Profile Besa_ext Inglês _ 21062007 v2	Evidence of the internal benchmark
/13/	Common practice – number of SHPPs	
/14/	Internal procedure	
/15/	P.O. calibration procedure	
/16/	Emission factor calculation	
/17/	Letters (invite) – Local Stakeholders	
/18/	ARs – Local Stakeholders	



Reference ID	Title / Description	Comments
/19/	Sensitive Analysis	



A.3 Annex 3: Overview of Findings

Findings Overview

Findings from validation of Angelina Small Hydro Power Plant Project – A Brascan Energética S/A

Project Activity.

Each Table below represents a finding from the validation assessment. The findings are numbered consecutively, approximately in the order that they have been identified. Description of Table:

- Type Findings are either New Information Requests (NIR) or Corrective Action Requests (CAR). CARs are items that must be addressed before a project can receive a recommendation for registration. NIRs may lead to the raising of CARs. Observations are included at the end and may or may not be addressed. They are primarily to act as signposts for the verifying DOE.
- Issue Details the content of the finding
- Ref Refers to the item number in the Validation Protocol
- Response Please insert response to finding, starting with the date of entry.

Rows for comments and further response will be appended to the table until the Findings has been addressed to the satisfaction of the Lead Assessor.

Date:	11/12/	2007	·	Rai	sed by:	Fabia Asse	an Gonçalves/G essor)	eisa Principe (trainee Lead			
No.:	1	Type:	CAR	Issue	Startin	ng date	e of the project a	ctivity	Ref.:	A.4.12	
				:							
Lead A	Assesso	r Comm	ent				Date: 11/12/200)7			
The ta	able req	uired fo	r the ind	ication	of projec	cted e	mission reduction	ons was	not c	orrectly applied. The	
indicat	ed start	ing peric	od was Ma	iy 2009,	which do	oes no	ot comply with th	e startin	g date o	of the crediting period	
inform	ed in Se	ction C	of the PDI	D.							
Project	t Partici	pant Res	sponse:				Date: 14/12/200)7			
The sta	arting da	ate of the	e project a	ctivity is	s 10 th Ma	y, 200	9. In that way, F	DD was	review	ed (version 3).	
Accept	tance ar	nd Close	out by Le	ad Ass	essor:		Date: 20/03/200)8			
Inform	ation Pr	ovided:					Verified Document Reference:				
PDD re	evised, v	version 3	3.					Ref.10			
Inform	ation Ve	erified:									
Table 2, table 8 and Item C.2.1.1of the PDD.											
Reasoning for not acceptance or acceptance and close out:											
Tables	2 and 8	3 in the r	evised PD	D are r	iow comp	olying	with the starting	date of t	the crea	liting period	
(10/05/	/2009).										

Please Note: This is an open list and more findings may be added as validation progresses.

CAR 1 was closed out.

Date:	11/	/12/2007	7	Rai by:	sed	Fabian Gonçalves	s/Geisa Principe	e (trainee Lead Assessor)
No.:	2	Туре:	NIR	lssue :	Baseli alterna projec	ine scenario and atives to the t activity	Ref.:	B.3.1
Lead A	Lead Assessor Comment Date: 11,					Date: 11/12/200)7	



The discussion of the identification of the most likely baseline scenario was found to be unclear. Section B.4 of the PDD presents the alternatives for the project (i.e. other investments areas of interest to the group). The information and evidence why the group decided to invest in power market (built the SHP Angelina) and not to invest in other areas should be provided.

Project Participant Response: Date: 14/12/2007

PDD was reviewed in order to identify the most likely baseline scenario represented by the continuation of the current situation of electricity supplied by large hydro with large reservoirs and thermal power stations. Section B.4 of the PDD presents the identification of the baseline scenario and alternatives to the Group. Alternatives to the project activity are different from alternatives to the Group company. Alternatives to the project activities are: the continuation of the current situation of electricity supplied by large hydro with large reservoirs and thermal power stations and the proposed project activity undertaken without being registered as a CDM project activity. Alternatives to the Group company are to invest in other areas of the group as: financial market, baking, real state and not in the power market. The Group decided to invest in power market regarding the incentives from CDM that the project could receive, evidenced by "Angelina_CashFlow.xls" which considers carbon credits revenues. Besides, the Group successful experience with the other 11 CDM projects registered as CDM was the key point to decision-making to implement the project activity.

Acceptance and Close out by Lead Assessor:	Date: 20/03/2008
Information Provided:	Verified Document Reference:
The project participant provided information	
about current (previous) situation of large	ANEEL Website (Brazilian power regulatory agency)
hydropower and thermal generation in Brazil,	banco de geração de energia
which is publicly available on ANEEL	
Website.	
Information Verified:	
The information that large hydropower	
represents 75% of the Brazilian's generation	
and thermal power 21%, was checked in	
ANEEL Website.	
Information Provided:	Verified Document Reference:
The Group Company provided, in Ref.12, the	
internal benchmark company of 16%.	Ref.9
Information Verified:	Ref.12
Confirmed that the Group company would	
invest in others market such as the financial	
market. The Group have the internal ROA	
(risk profile of the investment) of 16%, it is	
greater than the IRR of 12.9% per year	
(unlevered pre-tax - Ref.9).	
Reasoning for not acceptance or acceptance ar	nd close out:
The most plausible baseline scenario of the p	roject activity is the continuation of the current scenario by
large hydropower that represents 75% of Bra	zilian's generation and 21% by thermal powers. The data
sources and justifications for the baseline scena	ario discussed in the PDD (version 4) are satisfactory.
Regarding alternatives for the project activity pr	resented in the PDD, the Group would be investing in others

areas as financial market, and not in the power market.

The clarification provided by client is acceptable.

NIR 2 was closed out.

Date:	ate: 11/12/2007 Raised by:		Fabian Gonçalves / Geisa Principe (trainee Lead Assessor)					
No.:	3	Type:	CAR	Issue :	Step Tool,	1 a of the Addionality version4	Ref.:	B.4.2
Lead Assessor Comment			Date: 11/12/2007					

The "Tool" version 3 is used to demonstrate add	ditionality.				
Step 1a: other realistic and credible alternati	ve to the proposed project activity should be considered				
according to the Tool.					
Project Participant Response: Dat	e: 14/12/2007 and 27/03/2007				
Alternatives to the project activity are presente	d in PDD (version 3) according "Tool for the demonstration				
and assessment of additionality" (version 4)					
27/03/2007					
Alternatives to the project activity are presente	d in PDD (version 4) according "Tool for the demonstration				
Alternatives to the project activity are presented in PDD (version 4) according Tool for the demonstration and assessment of additionality" (version 4)					
According the Tool alternatives are to include:					
"(a) the proposed project activity undertake	on without being registered as a CDM project activity:				
(a) the proposed project activity undertake	scenario(s) to the proposed CDM project activity scenario				
that deliver outputs and on services with o	comparable quality properties and application areas, taking				
into account where relevant examples of s	construction areas, taking				
(c) if applicable continuation of the c	urrent situation (no project activity or other alternatives)				
(c) if applicable, continuation of the c	allent situation (no project activity of other alternatives				
Alternatives to Angelina project activity are:					
The proposed project activity undertaken y	without being registered as a CDM project activity (a)				
The alternative to the project activity	is the continuation of the current (providue) situation of				
- The alternative to the project activity	is the continuation of the current (previous) situation of				
For Angelina Project there are no other real	listic and credible alternatives (b) with the characteristics				
described by the teel sensidering that Brees	issue and credible alternatives (b) with the characteristics				
described by the tool considering that blast	an Energetica S.A. business, the company that controls				
cumbras Energetica S.A., are focused in the c	evelopment, implementation, construction and operation of				
	$\Delta t = \Delta \Delta \Delta t = \Delta \Delta t = \Delta \Delta \Delta t = \Delta \Delta \Delta t = \Delta \Delta \Delta \Delta$				
information can be accing at Proceen website:	ative is not applicable to the project activity proposed. More				
information can be seeing at Brascan website: I	ative is not applicable to the project activity proposed. More <u>http://www.brascanenergetica.com.br/</u>				
information can be seeing at Brascan website: <u>I</u> Acceptance and Close out by Lead Assessor:	ative is not applicable to the project activity proposed. More <u>http://www.brascanenergetica.com.br/</u> Date: 29/03/2008				
information can be seeing at Brascan website: <u>I</u> Acceptance and Close out by Lead Assessor: <u>Information Provided</u> :	ative is not applicable to the project activity proposed. More <u>http://www.brascanenergetica.com.br/</u> Date: 29/03/2008 Verified Document Reference: http://www.brascanenergetica.com.br/				
information can be seeing at Brascan website: <u>I</u> Acceptance and Close out by Lead Assessor: <u>Information Provided</u> : Project participant provided information about	ative is not applicable to the project activity proposed. More <u>http://www.brascanenergetica.com.br/</u> Date: 29/03/2008 Verified Document Reference: <u>http://www.brascanenergetica.com.br/empresa/missao.ht</u>				
information can be seeing at Brascan website: <u>I</u> Acceptance and Close out by Lead Assessor: <u>Information Provided</u> : Project participant provided information about "the mission and goal" of the Brascan	ative is not applicable to the project activity proposed. More <u>http://www.brascanenergetica.com.br/</u> Date: 29/03/2008 Verified Document Reference: <u>http://www.brascanenergetica.com.br/empresa/missao.ht</u> <u>m</u>				
information can be seeing at Brascan website: <u>I</u> Acceptance and Close out by Lead Assessor: <u>Information Provided</u> : Project participant provided information about "the mission and goal" of the Brascan company.	ative is not applicable to the project activity proposed. More <u>http://www.brascanenergetica.com.br/</u> Date: 29/03/2008 Verified Document Reference: <u>http://www.brascanenergetica.com.br/empresa/missao.ht</u> <u>m</u>				
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SGS

Date:	Date: 11/12/2007 Raised by:					Fabian Gonçalı	/es / Geisa Princip	be (trainee Lead Assessor)
No.:	4	Type:	NIR	Issue	Barrie	er Analysis	Ref.:	B.4.7
Lead A	Asse	essor Co	mmen	t.		Date: 11/12/20	007	

Barrier analysis:

Further substantiation is required regarding how the barriers prevent the implementation of this specific project activity and do not impact on the baseline. If the main argument to demonstrate the additionality of the project activity is the low IRR, this should be demonstrated using only step 2 of the additionality tool.

The PDD states that "It is important to notice that the direct comparison between the SELIC rate and the IRR is not accurate and the idea is not to introduce a benchmark analysis, but to set a parameter as a reference". In the investment analysis (step 2) a different value was used as benchmark.

The PDD states that "the region where the project is located is isolated and undeveloped. And due to that, there is a lack of infrastructure, such as roads, reliable electricity supply, communication and transports". Generally it's necessary to develop some infrastructure to implement the project, especially hydro power plants. This is a natural condition of this kind of project but not a barrier. Therefore, further clarification is required regarding lack of infrastructure as a barrier.

The institutional barrier described is of a generic nature. Further explanation and an update of circumstances are required as references are to the situation in the 90s. Regulatory uncertainty is mentioned as a barrier, since there is a new power sector regulation under development since January 2002. In addition, the overview of the Brazilian electricity market is of a generic nature and does not contribute to substantiate barriers.

Project Participant Response: Date : 14/12/2007

Although the main argument to demonstrate additionality is presented in step 2 of PDD, according determination from the additionality tool, barriers presented in step 3, section B.5 - regulatory uncertainty, institutional barrier and prevailing business practice -, have to be considered because they have influence and support the prevention of the project activity implementation and do not have influence in baseline scenario, as described in the PDD (version 3).

The statement related to the direct comparison between SELIC rate and IRR was withdrawal of the PDD because it is not related to the project's benchmark regarding investment analysis.

Although the lack of infrastructure exists and small projects, as Angelina, are more difficult to be implemented while large hydros are constructed by great companies and great consortia where these investments are easily surpassed, this barrier was withdrawal of the PDD (version 3).

Considering the Brazilian energy regulations, there are still institutional barriers related to the guarantee of the purchase of electricity, the definition of the role of the three different regulatory agents, juridical problems in the public calls legislation, the way the energy price is presently established, through the calculation of an average price for each type of energy source, penalizes projects with a lower cost-benefit rate. As evidence about these barriers, results about the recent energy auctions can be seeing and bibliography is presented in the PDD. Also, the regulatory uncertainty still exists. According CCEE, the average price was bellow BR\$ 50/MWh (less than USD 20/MWh) in 2004. This was only 3 years ago and considering the renewable energy market, 3 years are not enough to guarantee the stability of this market.

are not chough to guarantee the stability	
Acceptance and Close out by Lead	Date: 20/03/2008
Assessor:	
Information Provided:	Verified Document Reference:
The project participants provided	N/A
information regarding comparison	
between SELIC and IRR in the PDD.	
However, this comparison was	
withdrawn of the PDD because this	
discussion did not support the	
investments analysis.	
Information Verified:	
The PDD could not support comparison	
between SELIC and IRR approach.	



Information Browidad:	Varified Degument Reference:
The DDD stated that there is a leale of	
The PDD stated that there is a lack of	N/A
infrastructure in region where Angelina is	
being implemented.	
Information Verified:	
The PP could not provided evidences	
regarding the lack infrastructure where	
Angelina project is located.	
Information Provided:	Verified Document Reference:
With regards to Institutional barrier, the	CCEE Website:
CCEE Website evidenced high volatility	Average price in the middle of 2004.
of the electricity price in Brazil.	http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=39aca5c1de88a010VgnVCM100000aa01a8c0RCR
Information Verified:	
The CCEE website shows the average	
electricity price. This website presents	
the electricity prices for each region of	
Brazil. The electricity prices of the	
Southern region of Brazil - where the	
project activity is located - were	
analised.	
According to CCEE website in June of	
2004 the average price was of BR\$	
18 59 For year 2005 2006 and 2007 the	
electricity prices were BR\$ 26.63 BP\$	
P 20.00, DR Φ 20.00, DR ϕ	
oo.71 anu bra 50.24 tespectively.	

Reasoning for not acceptance or acceptance and close out:

It clearly demonstrated that the approach used in the investment analysis (SELIC and IRR) is not related to the project's benchmark. The explanation presented by PP is acceptable.

Regarding institutional barrier, the evidences provided and explanation about the energy regulations are still valid.

The institutional barrier prevents the implementation of the Angelina project activity through the fragilities presented by the energy regulatory market. These fragilities related to contractual guarantees of the purchase of energy, definition of rules, energy price, penalizes etc. <u>NIR 4 was closed out</u>.

Date:	11/12/2007				sed by:	Fabian Gonçalves / Geisa Pr Assessor)	ian Gonçalves / Geisa Principe (trainee Lead essor)			
No.:	5	Type:	NIR	Issue	Benchma	ark analysis	Ref.:	B.4.5		
				• •						
Lead A	Assesso	r Comm	ent			Date: 11/12/2007				
To provide evidences and source of the data use documents the information can be confirmed (ex. Ener The company has an internal rate of return called RO					the data med (ex. E turn called	used to calculate the IRR Energy tariff = PPA, etc). I ROA (return on assets) of	8. Pleas	se describe in which o provide evidence of		
this va	lue.									
Projec	t Partici	pant Res	sponse:			Date: 14/12/2007				
Evider	nces reg	arding I	RR calcul	ation an	d Brascan	ROA are together with this	PP's co	omments/answers. All		
inform	ation fro	m the P	DD is prov	vided in	the PDD b	bibliography and footnotes.				
Accept	tance ar	nd Close	out by Le	ad Asse	essor:	Date: 01/04/2008	Date: 01/04/2008			



Information Provided:	Verified Document Reference:
The project participants provided the following evidences:	Ref.9
- Calculation of IRR	Ref. 8
- Interest tax of 9.50%	Ref.10 pag 34
 Price of the electricity of R\$ 136,54 	
- ROA of 16%	
Information Verified:	
All evidences were confirmed during site visit.	
The financial indicator is the IRR (internal rate of return) that was	
calculated in the "Angelina cash-flow".	
The "cash-flow" shows that Angelina project activity was planned	
with an expected IRR of 12.9% (after tax) per year.	
The company internal benchmark is the ROA (return of assets). ROA	
is a measure used in all business (investments, strategy, principles	
prospects etc) made by company in 2007.	
The period for financial analysis considered was of 21 years	
(renewable crediting period).	
Reasoning for not acceptance or acceptance and close out:	14 - 1 - 14
Evidences and sources used for calculation of IRR were provided on s	ite visit.
As the project activity was planned before of construction date, all sour	ces were estimated.
The "Angelina cashflow" presents the following sources:	
 Total Investment : R\$ 133.961 Million (including interest tax + I 	ocal tax). (See Ref.9 -const.cost.)
 Investment with interest: R\$ 123.703 (Ref.8) 	
 Interests tax: 9.50% 	
 PPA: R\$ 136,54 	
 ROA of 16% (Ref. 10 – page 34). 	
All calculate, data, sources were validated. The financial analyses cor	nply with information presented in the
PDD.	
NIR 5 was close out.	

Date:	11/12/2007 Raised				sed	Fabian Gonçalves/Geisa Principe (trainee Lead Assessor)		
	by:							
No.:	6	Type:	NIR	Issue	Com	mon practice	Ref.:	B.4.8
				:		-		
Lead A	\sse	essor Co	mmen	t		Date: 11/12/20	07	
Regard	ding	the con	nmon j	oractice	urther	detail should be	provided in accor	rdance with the requirements of step 4
of the additionality tool. Similar project				Similar	proje	ct activities shou	Id be described	and the differences between each of
these a	activ	vities and	d the p	roject sh	ould b	e clearly indicate	d.	
Project Participant Response:						Date: 14/12/20	07	
Comm	on p	oractice	for sim	nilar proje	ects in	Brazil is the exis	tence of the barri	ers and the necessity of incentives, as
Proinfa	a an	d/or CD	M. Info	ormation	'data r	egarding commo	n practice are pro	ovided in step 4, section B.5, from the
PDD, and information/data sources.					es.			
Accept	Acceptance and Close out by Lead				ad	Date: 23/03/20	08	
Asses	sor:							

Information Provided:	Verified Document Reference:
The project participants provided official	
The project participants provided official	
information (ANEEL Agency) about	
similar and different project activities that	http://www.aneel.gov.br/arguivos/pdf/Resumo Geral mar 2008.pd
are occurring in the region	f
The number of small hydro powers	
occurring since 2005.	
5	Ref 12
Information Varified	
Information verified:	
In the reference 12 (Official information	
from ANEEL) and ANEEL website, it was	
verified that there are 13 SHPPs that	
started operation since 2005 (14 receive	
incentives from PROINFA and 18 from	
CDM)	
In 2007 9 SUDDe started energian in	
in 2007, 8 SHPPS started operation in	
Santa Catarina. 3 SHPPs receive	
incentives from Proinfa and 1 from CDM.	
Reasoning for not acceptance or acceptanc	e and close out:
Further information about similar and different	ences project activities that are occurring in the region was provided.
The PDD includes a research of small hydro	o power plants that have started operating in 2005.
The discussion of the research made, is ba	ased on the participation of small hydro plants (maximum of installed
capacity of 30MW resolution ANEEL 65	2 9/12/03) in the Brazilian Energy Market From 43 SHPPs 14
Capacity of John , resolution ANELE 05	2, 3, 12, 03, in the Brazinan Energy Market. From 45 Orin 13, 14

capacity of 30MW, resolution ANEEL 652, 9/12/03) in the Brazilian Energy Market. From 43 SHPPs, 14 received incentives from PROINFA and 18 from CDM (a total of 32 projects which make up 74.4% of the SHPPs). With regards to installed potency, these 32 projects make up 90,6% of the total 520.18MW of energy produced by SHPPs.

In 2007, when Angelina project activity started operating, there were 14 SHPPs in construction. Among the 14 SHPP's, 11 have received incentives (5 from CDM and 6 from PROINFA).

In Santa Catarina, where the project activity is located, there are 8 SHPPs that started operations in 2007. From these SHPPs, 3 received incentives from PROINFA and 1 from CDM. In terms of installed capacity, 37.34% (81.96MW) are installed in Santa Catarina. Of this, 79.9% receive some kind of incentive. Therefore, it was confirmed that, without financial incentives, in Brazil SHPPs are not common practice. Instead, Large hydro power plants and thermal fossil fuel generation are common practice.

NIR 6 was close out.

Date:	11/12/2007 Rais				sed by:	Fabi	Fabian Gonçalves/Geisa Principe (trainee Lead		
						ASSE			
No.:	7	Type:	NIR	Issue	Starting date of the project activity		Ref.:	B.4.3	
				:					
Lead Assessor Comment							Date: 11/12/2007		
To provide evidence and an explanation for the starti					for the s	starting	g date of the project activ	/ity: 01/0	09/2007.
Project	t Partici	pant Res	sponse:				Date: 27/03/2008		



PDD was reviewed (version 03) considering September 20th, 2007 as the starting date of the project activity according evidences presented to DOE.

This is the date of the preliminary EPC contract signing - Engineering, Procurement and Construction Contract (from the Portuguese *Contrato de Prestação de Serviços e Execução de Obras e Outras Atividades Preliminares para Implantação da PCH Angelina*). EPC final contract, finance schedule and physical schedule of the project are attached to this response.

27/03/2007

Lumbrás Energética S.A. had chosen the EPC company to develop Angelina SHPP since September 20th, 2007. However, the contract was signed only in December 2007 considering that discussion and contractual issues caused a delay in having the contract signed. Then, this date (December 2007) could not be used as the earliest of the dates of Angelina Project. In that way, Project Participants consider as the starting date of the project the date of the letter sent to BNDES on September 05th, 2007 by Lumbrás regarding the request for financing in its project. PDD was reviewed considering September 05th, 2007 as the starting date of the project activity.

Acceptance and Close out by Lead Assessor:	Date: 23/03/200	08
Information Provided:		Verified Document Reference:
The PP provided the document "Carta Besa CWB 16		
letter from Brascan requesting a loan from BND	ES. The letter	Ref.8
considered CDM for the project activity.		
Information Verified: The document " Carta Besa CWB 162/2007" states: "G governmental appeal (to meet the electric energy de of the country), Lumbrás Energética S.A. obtained a explore the hydroelectric potential in the condition producer, aiming the commercialization of the e produced. As the project refers to a Small Hydroelectri it will help the diversification of the Brazilian grid, be the greenhouse gas effects, becoming a Clean Mechanism (CDM) project, responsible for the emi (Certified Emission Reductions) likely to the commerci carbon credit market "	Considering the mand increase authorization to of independent electric energy ic Power Plant, esides reducing Development ssion of CERs ialization in the	
Reasoning for not acceptance or acceptance and clos	e out:	
The document "Carta Besa CWB 1162/2007" (ref.8)	was provided to	SGS. This document is evidence that
the starting date of the project activity is September 5 ^t	^h 2007.	
NIR 7 was closed out.		

Statement of Competence

Name:	Fabian Goncalves		SGS Affiliate:SGS Bra	zil
Status - - - -	Product Co-ordinator Operations Co-ordinator Technical Reviewer Expert			
		Validation	Verification	
- -	Local Assessor Lead Assessor Assessor			

/ Trainee Lead Assessor



Scopes of Expertise

- 1. Energy Industries (renewable / non-renewable)
- 2. Energy Distribution
- 3. Energy Demand
- 4. Manufacturing
- 5. Chemical Industry
- 6. Construction
- 7. Transport
- 8. Mining/Mineral Production
- 9. Metal Production
- 10. Fugitive Emissions from Fuels (solid,oil and gas)
- 11. Fugitive Emissions from Production and
- Consumption of Halocarbons and Sulphur Hexafluoride
 - 12. Solvent Use
 - 13. Waste Handling and Disposal
 - 14. Afforestation and Reforestation
 - 15. Agriculture

Approved Member of Staff by Siddharth Yadav Date: 18/10/2007

Statement of Competence





- 23. Solvent Use
- 24. Waste Handling and Disposal25. Afforestation and Reforestation
- 26. Agriculture

Approved Member of Staff by Siddharth Yadav Date: 22/08/2007