Industrie Service

Validation Report

Araputanga Centrais Elétricas S. A.

Validation of ARAPUCEL - Small Hydroelectric Power Plants Project

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Summary:

The Certification Body ”Climate and Energy” has been ordered by ARAPUtanga Centrais ELétricas S. A. to perform a validation of the above mentioned project.

Using a risk based approach; the validation of this project has been performed by document reviews and on-site inspection, audits at the locations of the project and interviews at the offices of the project developer and the project owner.

As the result of this procedure, it can be confirmed that the submitted project documentation is in line with all requirements set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board.

Prior to the submission of this validation report to the CDM Executive Board, TÜV SÜD will have to receive the written approval of the DNA of involved parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 790,209 tonnes CO_{2e} over a crediting period of seven years, resulting in a calculated annual average of 112,887 tonnes CO_{2e} represent a reproducible estimation using the assumptions given by the project documents.

Work carried out by:	• Werner Betzenbichler (Project manager, GHG lead auditor) • Odair Roveri (Lead Auditor Environmental Management Systems (ISO 14001), Local expert, GHG auditor - trainee) • Klaus Nürnberger (Lead auditor Energy Certification, GHG auditor)	Internal Quality Control by: Michael Rumberg

Abbreviations

AE	Applicant Operational Entity
ANEEL	Brazilian Electricity Regulatory Agency
ARAPUCEL	Araputanga Centrais Elétricas S. A.
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CR	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission reduction
GHG	Greenhouse gas(es)
KP	Kyoto Protocol
MP	Monitoring Plan
ONS	National Electric System Operator
PDD	Project Design Document
PPA	Power Purchase Agreement
PROINFA	Programa de Incentivo as Fontes Alternativas (=Program of Incentives to Alternative Energy Sources)
TÜV SÜD	TÜV Industrie Service GmbH TÜV SÜD Group
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual

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1 INTRODUCTION

1.1 Objective

ARAPUTANGA CENTRAIS ELÉTRICA S.A. has commissioned TÜV Industrie Service GmbH TÜV SÜD Group (TÜV SÜD) to validate the ARAPUCEL - SMALL HYDROELECTRIC POWER PLANTS PROJECT (ARAPUCEL-Project). The validation serves as design verification and is a requirement of all CDM projects. The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

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

1.2 Scope

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

The 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.

The audit team has been provided with a draft PDD end of November 2004. Based on this documentation a document review and a fact finding mission in form of an on site audit have taken place. Afterwards the client decided to revise the PDD according to the CARs and CRs indicated in the audit process also taking into account new developments on the regulatory side (as for example the new PDD format). This PDD version submitted in May 2005 was published from May 4 until to June 3, 2005. This revised PDD serves as the starting point for the final validation presented herewith. Afterwards the PDD was revised once more, including a changed crediting period, most recent numbers of daily dispatch information and new weights regarding operating margin factor and build margin factor respecting the guidance by EB. This version submitted in November 2005, which has also undergone a renewed document review, serves as the basis for the final assessment presented herewith.

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

- Ø Knowledge of Kyoto Protocol and the Marrakech Accords
- Ø Environmental and Social Impact Assessment

- Ø Skills in environmental auditing (ISO 14000, EMAS)
- Ø Quality assurance
- Ø Technical aspects of hydro power plants and grid operation
- Ø Monitoring concepts
- Ø Political, economical and technical random conditions in host country

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

Werner Betzenbichler. Werner Betzenbichler is physicist and head of the department "TÜV Carbon Management Service" located in the head office of TÜV Süddeutschland in Munich. Furthermore he is appointed as head of the certification body "Climate and Energy", which is accredited at UNFCCC as Designated Operational Entity. Before entering this department he worked as expert on air quality measurements and emissions inventories as well as on environmental auditing within the environmental branch of the company.

Odair Roveri is a consultant for quality and environmental management systems (according to ISO 9001 and ISO 14001) at Ingwaass Qualidade Continua. He is based in Sao Paulo. In his position he is responsible for the implementation of management systems. He has received extensive training in the CDM validation process and participated already in several CDM project assessments.

Klaus Nürnberger is head of the division energy certification at TÜV Industrie Service GmbH TÜV SÜD Group. In his position he is responsible for the implementation of verification and certifications processes for electricity production based on renewable sources. The division has assessed more than 600 plants and sites all over Europe in particular hydro power plants. He has received extensive training in the CDM and JI validation processes and participated already in several CDM and JI project assessments.

The audit team covers the above mentioned requirements as follows:

- Ø Knowledge of Kyoto Protocol and the Marrakech Accords (BETZENBICHLER / NÜRNBERGER)
- Ø Environmental and Social Impact Assessment (NÜRNBERGER / ROVERI)
- Ø Skills in environmental auditing (ALL)
- Ø Quality assurance (RUMBERG)
- Ø Technical aspects of hydro power plants and grid operation (NÜRNBERGER / BETZENBICHLER)
- Ø Monitoring concepts (NÜRNBERGER / BETZENBICHLER)
- Ø Political, economical and technical random conditions in host country (ROVERI)

1.3 GHG Project Description

The objective of the ARAPUCEL Project is to generate renewable electricity using hydro power resources and to sell the generated output to the South-Southeast-Midwest Grid on the basis of a power purchase agreement (PPA). The project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants that supply the South-Southeast-Midwest Grid, which is connected to the North-Northeast Grid of Brazil and with one interconnection to Argentinian grid.

The proposed ARAPUCEL Project is located along the Jauro River within the State of Mato Grosso. The project involves the installation of 3 hydro power plants, providing a total of 74 MW. All of them are according Brazilian regulation operated as ”small hydro power plants”.

Project participants are the three operators of the individual plants Araputanga Centrais Elétricas S. A., Arapucel Indiavaí S.A. and Arapucel Ombreiras S.A. as Project Proponents. Majority shareholder of all these Brazilian project participants is BK Energia Ltda.

The project starting date is September 1, 2002 and the seven year renewable crediting period starts September 1, 2002, too.

2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see www.vvmanual.info), an initiative of all Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

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

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

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

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

Validation Protocol Table 1: Mandatory Requirements			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

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

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

Figure 1 Validation Protocol Tables

2.1 Review of Documents

The project design document submitted by the Client and additional background documents related to the project design and baseline were reviewed. A complete list of all documents reviewed is attached as annex 2 to this report.

2.2 Follow-up Interviews

In the periods of December 8, 2004 and April 20 - 21, 2005 TÜV SÜD performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of EcoInvest and ARAPUCEL and Alstom were interviewed. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
EcoInvest	Ø Project design Ø Technical equipment Ø Sustainable development issues Ø Additionality Ø Crediting period Ø Monitoring plan Ø Management system Ø Environmental impacts Ø Stakeholder process Ø Approval by the host country
ARAPUCEL	Ø Project design Ø Technical equipment Ø Sustainable development issues Ø Monitoring plan Ø Environmental impacts Ø Stakeholder process
ALSTOM	Ø Technical equipment Ø Training programs

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needed to be clarified for TÜV SÜD`s positive conclusion on the project design. The Corrective Action Requests and Clarification Requests raised by TÜV SÜD were resolved during communications between the client and TÜV SÜD. To guarantee the transparency of the validation process, the concerns raised and responses that given are summarised in chapter 3 below and documented in more detail in the validation protocol in annex A.

3 VALIDATION FINDINGS

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

1) The findings from the desk review of the final project design document and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in Annex A.
2) Where TÜV SÜD had identified issues that needed clarification or that represented a risk to the fulfilment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Annex A. The validation of the project resulted in one Corrective Action Requests and three Clarification Requests.
3) Where Clarification or Corrective Action Requests have been issued, the exchanges between the Client and TÜV SÜD to resolve these Clarification or Corrective Action Requests are summarised.
4) The final conclusions for validation subject are presented.

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

3.1 Project Design

3.1.1 Discussion

The current project participants are Araputanga Centrais Elétricas S.A., Arapucel Indiavaí S.A. and Arapucel Ombreiras S.A., Brazil and the Dutch Ministry of Housing, Spatial Planning and Environment (VROM). Brazil as the host contry meets all relevant participation requirements. But the project has not been approved by the national DNAs yet and no Letter of Authorization has been issued.

The objective of the ARAPUCEL Project is to generate renewable electricity using hydro power resources and to sell the generated output to the South-Southeast-Midwest Grid on the basis of a power purchase agreement (PPA). The project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO_2 emissions from electricity generation by fossil fuel power plants that supply the South-Southeast-Midwest Grid.

The project boundaries are clearly defined. The project bundles 3 installations of hydro power plants at several sites along the Jauro River in the state of Mato Grosso. During this assessment TÜV SÜD visited all plants indicated by the PDD.

The project equipment can be expected to run for the whole expected operational lifetime of the project activity and it can not be expected that it will be replaced by more efficient technologies.

Initial training and maintenance efforts are required. In the PDD and during the visit on site the project developer confirmed that such a training has taken place. Documentation on executed training activities has been submitted.

The design engineering does reflect current good practices. The design has been professionally developed and laid out in project feasibility studies. Subsequently the power plants got the approvals by the relevant authorities. The project itself does apply state of the art equipment.

The project is in line with relevant legislation and plans of Brazil and fulfills the Brazilian requirements for run-of-river hydro power plants. Brazil has published the Interim Measures for Operation and Management of Clean Development Mechanism Projects (NDRC, June 2004). According to this document renewable energy projects belong to the favoured options under the CDM. Hence, the project can currently be seen as being in line with the host country specific requirements for CDM. The question can finally be answered after the issuance of the Letter of Approval by the Brazilian DNA.

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

The starting date as well as the operational lifetime are clearly defined and also handled in a reasonable manner. The renewable crediting period is with 7 years clearly defined. But it has to be mentioned that the first three years of the crediting period will result in a lowered generation of emission reductions as during this time the project was not fully operational yet.

Moreover its is assured that as the start of the crediting period is before the registration of the project that the project activities starting date falls in the period between 1 January 2000 and the registration of the first clean development mechanism project. During the validation process the audit team obtained the information and evidenced that the start of project activities has been before the registration date of the first clean development mechanism project.

3.1.2 Findings

Outstanding issue:

The project has not yet obtained any Letter of Approval issued by the host country and the investor country.

Response:

The response will be given by the issuance of the Letter of Approval. This has not happened so far for the host-country side as the approval of the project depends on the review of the validation report which has to be submitted in advance.

Clarification Request No. 1:

The boundaries of the regional grid should be described more detailed; the connections to other grids should be clearly identified and illustrated.

Response:

The revised PDD contains a detailed map of S-SE-CO grid. Part of the electricity consumed in the country is imported from other countries. Argentina, Uruguay and Paraguay supply a very small amount of the electricity consumed in Brazil. In 2003 around 0.1% of the electricity was imported from these countries. In 2004 Brazil exported electricity to Argentina which was experiencing a shortage period. The energy imported from other countries does not affect the boundary of the project and the baseline calculation.

Clarification Request No. 2:

It is necessary to indicate in the PDD the minimum flow required for the turbine (per turbine and total), so that it is possible to compare the values with the dry seasons flow rate which is a relevant criteria in Brazil to justify the projects as a run-of-river plant.

Response:

The minimum flow rates of the turbines are indicated in the revised PDD.

Clarification Request No. 3:

The relevant indicators of preventive and conditioned based maintenance program should be delivered to the validation team.

Response:

O&M procedures were provided to the audit team, which describes the indicators of the preventive and conditioned based maintenance program.

Clarification Request No. 4:

The operating license of Ombreira should be submitted to the validation team as soon as available.

Response:

Operating Licence of PCH Ombreiras was provided to the audit team.

3.1.3 Conclusion

The Letter of Approval issued by the host country and investor country should be submitted to the audit team before requesting registration.

The project fulfils the Brazilian criteria of Electrobras for run-of-river plants ("the projects where the river's dry season flow rate is the same or higher than the minimum required for the turbines").

The project's spatial boundaries are clearly described for the project installation and respective emissions reduction through electricity generation by renewable energy. The connections of S-SE-CO grid to other grids are clearly identified. The energy imported from other grids ore countries does not affect the boundary of the project and the baseline calculation.

The relevant indicators of the preventive and conditioned based maintenance program are mentioned. These are i.e. thermography, chromatography of soluble gases, physically and chemically analysis of oil. The implemented preventive and conditioned based maintenance program is efficient tool to manage maintanance.

The necessary licenses to construct and to operate the power plants are present.

The issues of the clarification requests above are considered to be resolved. The project does comply with the requirements.

3.2 Baseline

3.2.1 Discussion

The consolidated baseline methodology applied has been approved by the CDM Executive Board and made public in September 2004.

The baseline methodology is deemed to be the one, out of the existing approved baseline methodologies, most applicable for this project by the time the PDD development started. The

PDD responds to each of the applicability criteria which are outlined in the baseline methodology. The determination of the weighted average of the operating and build margin is according the procedures provided by the chosen methodology. But data input (plant efficiencies) for estimations is based on literature figures not being considered as conservative especially for recently installed gas fired power plants. In absence of available data the project developer decided for keeping provable data instead of more conservative estimations. Anyway this discussion should have a stronger focus during verification. At that time such a risk for having an (even small) overestimation will not be acceptable.

It can be confirmed that the application, discussion and determination of the chosen baseline methodology is transparent. The application follows exactly each of the steps outlined in the methodology and answers the corresponding sections in a proper manner. The decisive factors for the baseline determination, the baseline emission factor and the capacity factor of the installed turbines, are determined in a transparent manner, but during later verifications the aspect of conservativeness when determing the combined margin on figures based on plant capacity factors should be taken into account.

The baseline refers to project specific data but could also serve other renewable energy projects in the South-Southeast-Midwest Grid as a basis for their baseline establishment.

The PDD apply coorectly and transparently the additionality tool as required. The statements made are proven by doumentary evidence. The additionality tool as part of the methodlogy asks for a qualitative assessment of barriers facing the proposed project. The PDD elaborates on these barriers and gives convincing arguments that the project has faced barriers which could be overcome by applying CDM to the project. It has also been considered that other hydro power projects have been implemented before at the same site without support from CDM. To do so, it has been discussed and supported by corresponding information to what extent these projects faced the same barriers and why and how the other projects could be implemented without CDM.

3.2.2 Findings

Corrective action request CAR1:
In Step 4. “Common Practice analysis” should be shown that the small hydro power plants, which are under construction or still under development are comparable or not comparable with the project itself.

Response:
A list of small hydro power plants which were currently implemented was established by project developer and provided to the audit team. The new projects under development in Brazil are inside the PROINFA-Program.

Corrective Action Request CAR2:
The project has been partially implemented although a registration of the project as a CDM activity has not taken place. Please describe in chapter B2 (i.e. as step 0) and based on defined documents how the CDM has been taken into account from the beginning of the project in order to demonstrate the additionality of the project.

Response:
At the time the project started its construction (2001) the EB was not established yet and when the project started its operation (2002) there was no approved methodology for this kind of project. But, although those enormous uncertainties presented at the time, such as the entry

into force of the Protocol, size of the market/price of the CERs, no nominated executive board, lack of approved baseline/monitoring methodologies and so on, the project owners took the risk and seriously considered the incentive from the CDM in the decision to proceed with the activity.

The project sponsors were already analyzing the CDM for other projects as described in the PDD. The transfer of the ownership to the Project Sponsor BK Energia Participações Ltda. is shown by the agreement from ANEEL, July 2001. The request was made in April 2001.

Corrective action request CAR3:

The major risks to the baseline should be discussed in the PDD.

Response:
The baseline determination follows exactly what it is described in the methodology and project developer didn't find any major risk to the baseline. Further, the guidance given by Executive Board is requesting to all project to renew the baseline every year, "ex-post".

Clarification request No. 5:

The baseline should be determined using conservative assumptions, but this topic is mentioned nowhere.. It should be explained, where are conservative assumptions used by determining the baseline.

Response:

The baseline is determined according the approved methodology using default figures from literature for providing input data on plant capacities.

3.2.3 Conclusion

According to the project developer the currently implemented small hydro power plants in Brazil are foreseen as CDM projects, as far as the information about those projects are available. Other projects under development are inside the PROINFA-Program, which funds renewable energy projects.

The proven transfer of the ownership to the project sponsor is accepted as evidence that the project started after the non-objection letter was issued from Brazilian Interministerial Commission on Global Climate Change for the Piratini Project, therefore proving the correct application of the step 0 test of the additionality tool.

The baseline is determing factors according to the applied methodology. The used emission factors can be regarded being derived transparently using default values. Nonetheless it will be necessary during verification to discuss the availability of more accurate figures for modern plants which will show higher efficiencies. Hence accurate figure for modern plants will be considered to be more conservative. In respect of determing the baseline emission factor every year "ex-post" the risk to the baseline is very limited.

The issues of the corrective action and clarification requests are considered to be resolved. The project does comply with the requirements.

3.3 Monitoring Plan

3.3.1 Discussion

The monitoring methodology applied has been approved by the CDM Executive Board and made public in September 2004. The methodology is deemed to be the one out of the existing approved monitoring methodologies most applicable for this project. The PDD responds convincingly to each of the applicability criteria which are outlined in the monitoring methodology.

The project itself does not cause any relevant project and leakage emissions. Hence no project and leakage emissions become reported.

The monitoring plan does contain all relevant parameters in order to monitor the baseline emissions but does not detail this information in a more specific manner.

Procedures for unintended emissions have not been identified as due to the project design unintended emissions can not occur. A detailed quality control and quality management system is not yet available. But as the operation of the turbines as planned is checked continiously by the control room staff, the most decisive project parameter, the electricity production, is constantly surveilled. This approach is deemed to be sufficient.

All other quality relevant procedures are identified and described in the PDD.

3.3.2 Findings

Corrective action request CAR4:
The responsibilities for registration, monitoring, measurement and reporting are not explicit described in the PDD.
The PDD should describe the responsibilities for registration, monitoring, measurement and reporting the relevant date. date. I.e. it should be mentioned that CEMAT is responsible for measuring the delivered electricity to the grid and which standard for calibration is to comply; ARAPUCEL is measuring exported electricity itself as control measurement.

Response:

The electricity delivered to the grid is monitored by the Project as well as by the energy buyer CEMAT. CEMAT is responsible for annually calibration, too. Monitoring and reporting will be done by Brennand Energia, the holding company that controls the three power plants. There's nobody specific selected for this job yet.

3.3.3 Conclusion

The PDD describes that electricity delivered to the grid is monitored by the project as well as by the energy buyer (CEMAT). ARAPUCEL is measuring exported electricity itself as control measurement. The responsibilities for registration, monitoring, measurement and reporting are sufficiently clarified.

The project does comply with the requirements.

3.4 Calculation of GHG Emissions

3.4.1 Discussion

The project spatial boundaries are clearly described. Also the projects system boundaries are clearly defined. The project equipment is exactly described in technical terms and with an exact product description according the manufacturer information.

The project does properly account for all relevant emissions. GHG calculations are documented in a complete and transparent manner

All emission reduction estimations have been determined according to the methodology applied at this project.

3.4.2 Findings

Clarification request Nr. 6:

Please add information concerning in the GHG emission reductions estimation! It is not indicated in the PDD that conservative assumptions have been used for calculating baseline emissions. Which uncertainties are in the GHG emission estimates?

Response:

See revised PDD.

3.4.3 Conclusion

The estimation of emissions reductions is done by an MS Excel spreadsheet correctly implementing the algorithm and procedures provided by ACM0002. But data input (plant efficiencies) concerning the emissions of thermal power plants connected to the grid is based on literature figures not being considered as conservative especially for recently installed gas fired power plants. In absence of available data the project developer decided for keeping provable data instead of more conservative estimations. Anyway this discussion should have a stronger focus during verification. At that time such a risk for having an (even small) overestimation will not be acceptable.

With regard to the statements given above the issue is considered to be resolved.

The estimation of the projected emission reductions represents a reproducible estimation using the assumptions given by the project documents.

3.5 Environmental Impacts

3.5.1 Discussion

The project will create few adverse environmental impacts. The environmental impacts are not considered significant. The description of the relevant impacts is done in detail in the ”Preliminary Environmental Reports”. Annually the supervision of some impacts must be monitored and reported in a environmental report.
The Project design addresses environmental impacts; with proper designed turbines it is possible to operate the power plants with the average flow in the dry season. Therefore it can

be prevented mostly to stop the machines and to store water. The power plants are designed and operated so that a biological minimum flow through original river bed is guaranteed. Smaller areas which will be flooded are deforested and construction sites will be reforested after finished construction works.
Requirements for EIAs exist in the host country and have already been fulfilled.

3.5.2 Findings

No other findings.

3.5.3 Conclusion

The project does comply with the requirements.

3.6 Comments by Local Stakeholders

3.6.1 Discussion

A formal consultation process with local stakeholders has taken place in parallel to the validation process and corresponding information has been submitted to the audit team. Although this fact led to missing information in the PDD when making it publicly available no global stakeholder expressed any concern on that fact.

No local stakeholder process is required according to national legislation.

The comments to the latest project design have been provided.

In order to consider the comments made also in the future a continious communication with the local stakeholders is envisaged.

3.6.2 Findings

Clarification Request No. 7:

In addition to the UNFCCC global stakeholder process, this project was open for comments from locals at the same time. Any comments will be disclosed after validation.
When the local stakeholder process for hydro power plant Ombreira has been conducted, the information should be added to the revised PDD.

Response:

In the revised PDD it is indicated that while the PDD of the project was published on the UNFCCC website the project proponent has sent letters to the relevant local stakeholders in order to invite their comments.

Clarification request No. 8:

In addition to the UNFCCC global stakeholder process, this project will be open for comments from locals at the same time. The local comments should be delivered to the validation team.

Response:

The project didn’t receive any comments from the local stakeholders.

3.6.3 Conclusion

There is yet no guidance by the EB available clarifying the need for repeating validation in case a final PDD differs at that item from a previous version. Hence it could be considered that there is no deviation of the existing modalities and procedures of the CDM, Therefore the project complies with the requirements.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

TÜV SÜD published the project documents on its website on May 4, 2005 and invited comments within 30 days, until June 3, 2005 by Parties, stakeholders and non-governmental organisations. The PDD and the received comment have been publicly available under the following link:

http://www.netinform.de/KE/Wegweiser/Guide2E.aspx?Ebene1_ID=179

4.1 Content of the comments received

A comment has been submitted by Axel Michaelowa, Hamburger Welt-Wirtschafts-Archiv (HWWA). HWWA is an accredited observer organisation to the United Nations Framework Convention on Climate Change Conference of the Parties.

The comment has the following content:

1. *The project bundle has a capacity of more than 15 MW and thus does not satisfy the criteria for bundling. Project participants would have to submit separate PDDs. While I would like the bundling threshold to be lifted by the EB, there should be a level playing field for all developers.*
2. *With an IRR of 17%, the case for additionality is inconclusive. Given the strong incentive policies of the Brazilian government after the electricity crisis of 2001, there are no prohibitive barriers for hydropower expansion in Brazil. The small argumentation about barriers in the PDD is thus not convincing.*

4.2 Response by TÜV SÜD

The comment has been submitted during the 30 days stakeholder period and is submitted by an accredited observer organisation. Hence the comment had to be considered in the validation process.

The audit team came to the following conclusion:

1. The validation team can not identify any rules which do not allow bundling of sites to one CDM project. Furthermore such rules would contradict the definition of a small scale project according to the Kyoto Protocol that a small scale project can not be part of a debundled project.
2. The demonstration of additionality in the PDD was assessed by the validation team. Investment barrier is part of demonstrating additionality. Taking into consideration the investment climate in Brazil, CDM is an important incentive for the decision to implement the project. The implementation of the Brazilian PROINFA-program proves that funding

of such renewable projects is also necessary by local authorities. Moreover it is accepted that projects applying for the Proinfa-program will still be eligible to use CDM. The project assessed does not go for both components, hence the statement that CDM had an important impact during the decision making process is deemed to be more reliable.

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VALIDATION OPINION

TÜV SÜD has performed a validation of the ARAPUCEL Project in the state of Mato Grosso in Brazil . The validation was performed on the basis of UNFCCC criteria and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided TÜV SÜD with sufficient evidence to determine the fulfilment of stated criteria.

In summary, it is TÜV SÜD´s opinion that the ARAPUCEL Project, as described in the revised project design document of October 2005, meets all relevant UNFCCC requirements for the CDM, set by the Kyoto Protocol, the Marrakech Accords and relevant guidance by the CDM Executive Board and that the project furthermore meets all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002.

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

Prior to the submission of this validation report to the CDM Executive Board, TÜV SÜD will have to receive the written approval of the DNA of involved parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. An analysis of the investment and technological barriers demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

Additionally the assessment team reviewed the estimation of the projected emission reductions. We can confirm that the indicated amount of emission reductions of 790,209 tonnes CO_{2e} over a renewable crediting period of seven years, resulting in a calculated annual average of 112,887 tonnes CO_{2e} represents a reproducible estimation using the assumptions given by the project documents.

The validation is based on the information made available to us and the engagement conditions detailed in this report. The validation has been performed using a risk based approach as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle. Hence, TÜV SÜD can not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

Munich, 2005-11-09

Michael Rumberg

Deputy Head of Certification Body "climate and energy"

Munich, 2005-11-09

Werner Betzenbichler

Project Manager

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Annex 1

Validation Checklist

Annex 2

Information Reference List