VALIDATION REPORT

UTE BARREIRO S.A. RENEWABLE ELECTRICITY GENERATION PROJECT - BRAZIL

REPORT NO. 2005-0025

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DET NORSKE VERITAS

VALIDATION REPORT

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Client: V&M do Brasil SA	Client ref.: Ledomiro Braga da Silva

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:

Det Norske Veritas Certification Ltd. (DNV Certification) has performed a validation of the UTE Barreiro S.A. Renewable Electricity Generation Project in Brazil on the basis of UNFCCC and host Party criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol criteria and the simplified modalities and procedures for small-scale CDM project activities. This validation report summarizes the findings of the validation.

The validation consists of the following three phases: i) a desk review of the project design and the baseline and monitoring plan, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV's opinion that the "UTE Barreiro S.A. Renewable Electricity Generation Project "as described in the revised and resubmitted project design document of August 2005 meets all relevant UNFCCC requirements for CDM and all relevant host country criteria and correctly applies the simplified baseline and monitoring methodology for category ID small scale CDM project activities. Hence, DNV will requests the registration of the "UTE Barreiro S.A. Renewable Electricity Generation Project"as CDM project activity. Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of the participating Parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development

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Work carried out by: Luis Filipe Tavares, Michael Lehmann, Ramesh Ramashandran	
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Table of Content *Page*

Abbreviations

ANEEL	Brazilian Electricity Agency (Agência Nacional de Energia Elétrica)
BM	Build margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N-NE	North-Northeast
N_2O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating margin
ONS	National Electricity System Operator (Operador Nacional do Sistema)
PDD	Project Design Document
S-SE-CO	South-Southeast-Midwest
UNFCCC	United Nations Framework Convention for Climate Change

1 INTRODUCTION

V&M do Brasil SA (V&M) has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the UTE Barreiro S.A. Renewable Electricity Generation Project at Belo Horizonte, Minas Gerais State, Brazil (hereafter called "the project").

The validation team consists of the following personnel:

Mr Luis Filipe Aboim Tavares	DNV Rio de Janeiro	Team leader, GHG auditor
Mr Michael Lehmann	DNV Oslo	Energy sector expert
Mr Ramesh Ramashandran	DNV Chennai	GHG auditor
Mr Einar Telnes	DNV Oslo	Internal verifier

1.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the 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).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDMM project activities and the relevant decisions by the CDM Executive Board. The validation team has, based on the recommendations in the Validation and Verification Manual /8/ employed a risk-based approach, 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 project participants. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 GHG Project Description

The project activity consists of the construction of a 12.9 MW thermoelectric plant that will generate part of the electricity required by Barreiro's Integrated Steel Plant (Usina Siderúrgica Integrada do Barreiro).

The thermoelectric plant may use three different fuels: blast furnace gas, wood tar and, exceptionally, natural gas. The plant is designed to operate at 100% capacity using only blast furnace gas and wood tar. During regular operation conditions no natural gas will be used. Nevertheless, in the case of reduced supply of the other two fuels, in order to ensure the electricity generation, natural gas may be used.

As a consequence of the construction of the plant there will be a reduced need for electricity supplied from the grid for the operation of the steel plant.

Since in the absence of the project the blast furnace gas will continue to be flared, there will be no additional GHG emissions associated with the use of this gas to generate electricity. Furthermore, all the steel production at the plant is based on the use of charcoal as reducing agent, which is produced from wood from sustainable eucalyptus plantations. Hence, the blast furnace gas, a by-product of the steel production, can be considered as a renewable energy source. Similarly, as the wood tar is obtained as a by-product from sustainable charcoal production it can be considered a renewable source of energy. The project will only result in GHG emissions when natural gas is used as fuel. Nonetheless, since the forecasted use of natural gas is expected to be low (ca 5%), the overall project emission are expected to be only 4207 tCO_2e per year.

The electricity provided by the regional grid results in significant emissions of CO_2e per MWh generated. Therefore, by reducing the electricity consumption of the UTE Barreiro plant, the project will result in net emission reductions. During the first seven years crediting period starting on 1 January 2004, the project is on average expected to displace 48 129.9 tCO_2e per year through the generation of renewable energy.

2 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design and the baseline and monitoring methodology
II follow-up interviews with project stakeholders
III the resolution of outstanding issues and the issuance of the final validation report and opinion.

Findings established during the validation can either be seen as a non-fulfilment of validation criteria or where a risk to the fulfilment of project objectives is identified. *Corrective Action Requests* (CAR) are issued, where:

i) mistakes have been made with a direct influence on project results;
ii) CDM or host Party 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 certified.

The term *Clarification* may be used where additional information is needed to fully clarify an issue.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /8/. 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 validation 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 for the UTE Barreiro S.A. Renewable Electricity Generation Project is enclosed in Appendix A to this report.

2.1 Review of Documents

The initial Project Design Document /1/ submitted by V&M do Brasil SA on 11 August 2003, the revised PDD of December 2004 /2/ and the final PDD of August 2005 /4/ were reviewed. In addition spreadsheets documenting the calculation of the combined margin /5/ and a spreadsheet documenting the cash flow calculations were reviewed.

Others documents, such as the Environmental Impact Assessment, Environmental Installation Licence and the invitation of comments by local stakeholders were reviewed during the site visit.

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 sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below). **Clarification** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project participants response***	***Validation conclusion***
If the conclusions from the 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

2.2 Follow-up Interviews

On 29 October 2003 DNV performed interviews with staff of V&M UTE Barreiro /9//10/ and EcoSecurities /11/ during a site visit at the UTE Barreiro plant at Belo Horizonte, Minas Gerais State, to confirm and to resolve issues identified in the document review.

The main topics of the interviews were:

- Environment licenses requirements compliance,
- Blast furnace gas and wood tar use for electricity generation
- Verification of the calculation of the combined margin,
- Verification of project additionality.

2.3 Resolution of Clarification and Corrective Action Requests

The validation identified 1 (one) *Corrective Action Requests* which was in November 2004 presented to the project participants in the form of a draft validation report. Subsequently, V&M provided clarifications and additional information and submitted a revised PDD /2//4/ and spreadsheets for the calculation of the combined margin /5/. The response provided by project participants and the revised PDD sufficiently addressed one *Corrective Action Request*.

To guarantee the transparency of the validation process, the concerns raised by DNV and the response provided by the project participants are documented in Table 3 of the Validation Protocol in Appendix A.

3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the PDD of August 2005.

3.1 Participation Requirements

The project participants are Vallourec & Mannesmann Tubes (Brazil) and EcoSecurities (UK). All Parties involved, i.e. Brazil and the United Kingdom, meet the requirements to participate in the CDM.

The project will be funded by V&M and the validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

3.2 Project Design

The project is a renewable energy project activity with an output capacity of less than 15 MW, i.e. 12.9 MW. Hence, the "UTE Barreiro S.A. Renewable Electricity Generation Project" qualifies as a category I.D small-scale CDM project activity (Renewable Energy Projects / Renewable electricity generation for a grid) as outlined in Appendix B of the simplified modalities and procedures for small-scale CDM project activities: Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories /6/.

The thermoelectric plant will be mainly powered by two sources of energy: Blast furnace gas and wood tar. In addition, natural gas may be used in case the other two fuels are not available.

All the steel production at the Barreiro plant is based on the use of charcoal as reducing agent, which is produced from wood from sustainable eucalyptus plantations. Hence, the blast furnace gas, a by-product of the steel production, can be considered as a renewable energy source. Similarly, as the wood tar is obtained as a by-product from sustainable charcoal production it can be considered a renewable source of energy.

In order to consider the blast furnace gas and wood tar a renewable energy source, it must be ensured that the origin of the wood used to produce charcoal is obtained from sustainable managed plantation. In the case of the proposed project, all the wood is supplied by V&M Florestal, a subsidiary of V&M do Brasil, whose main objective is to supply all the charcoal needed by the V&M do Brasil steel production. The company is certified by the Forest Stewardship Council (FSC), which provides a credible guarantee that the wood comes from a sustainable managed forest.

The thermal plant may use, in some exceptional cases, natural gas as fuel. Natural gas is not a renewable source of energy. However, the proposed project still meets the definition of a co-fired unit with an installed capacity below the limit of 15 MW as stated in paragraph 24 of Appendix B to the simplified modalities and procedures for small-scale CDM project activities.

AMS I.D comprises projects that "that supply electricity to an electricity distribution system". The electric energy generated by the project will be used by V&M Barreiro's integrated steel

plant and will reduce the imports from grid electricity and thus displace energy from the regional grid. As this project activity reduces grid electricity imports and thus avoids marginal fossil fuel based electricity generation, DNV is in favour of the project being considered under AMS I.D. This is, however, subject to the final acceptance of the CDM Executive Board with regard to whether AMS I.D can also apply to projects that generate electricity for their own use.

3.3 Baseline and Additionality

The baseline is established according to the simplified baseline methodology for category I.D small-scale CDM project activities (Renewable Energy Projects / Renewable electricity generation for a grid). The baseline emission coefficient is determined as the average of the approximate operating margin (OM) and the build margin (BM), i.e. the combined margin, in accordance with the simplified baseline methodology for category I.D small-scale CDM project activities /6/.

The initial determination of the combined margin emission coefficient was based on an International Energy Agency (IEA) study on the Brazilian electricity grid carried out in 2002 (using data from 2000). The IEA study was based on installed capacity of plants built up to 2004 and assumptions regarding the plant efficiency and load factor. However, the IEA study did not calculate the combined margin as required by the simplified baseline methodology for category I.D small-scale CDM project activities and DNV requested the project participants to recalculate the combined margin emission coefficient.

Eventually, the project participants managed to obtain more recent data on the Brazilian electricity grid from the National Electricity System Operator (ONS) and recalculated the combined margin emission coefficient based on actual electricity generation data provided by ONS for the South-Southeast-Midwest (S-SE-CO) grid. Average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid and IPCC carbon emission factors for specific fuels were applied to calculate plant specific emission coefficients.

Although the ONS data only covers 76.4% of the installed capacity in the S-SE-CO grid, the recalculation of the operating and build margin emission coefficient based on actual dispatch data for the years 2001-2003 represents an improvement of the data quality compared to the original data from the IEA study. Data for the years 2001-2003 are the most recent statistics available and the data was verified against the data published on the ONS website. 2004 data was not publicly available at the time of writing this report.

The recalculated combined margin emission coefficient of 0.521 tCO_2e/MWh is calculated in accordance with the simplified baseline methodology for category I.D small-scale CDM project and is appropriate due to the following:

- *Operating margin*: No electricity generation data is publicly available for the remaining 23.6% of power plants which electricity is not dispatched through ONS. However, these plants are not likely to be affected by a CDM project. They operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access.
- *Build margin*: The build margin emission coefficient calculated for only power plants dispatched by ONS is more conservative than the emission coefficient calculated based on IEA data or the combination of IEA and ONS data.

- *Project electricity system*: Even though the S-SE-CO grid is connected with the North-Northeast (N-NE) grid, the energy flow between N-NE and S-SE-CO grids are heavily limited by the transmission lines capacity. Hence, and given the relative small capacity of the project, it is appropriate to consider data on the S-SE-CO grid only.

The additionality of the project was demonstrated trough a barrier test. The main barrier presented are technological and investment barriers. The use of blast furnace gas for energy generation is not common practice in charcoal steel plants in Brazil. Indeed, the use of furnace gas combined with wood tar for the generation of electricity, as proposed by the project, is the first of its kind. It is also demonstrated that the project faces investment barriers due to the fact that technological innovations of the project bear significant financial risk. It is also worth noting that the project can not apply under the PROINFA program, which promotes renewable energy projects (e.g., biomass, wind, and small hydro units), as the project does not intend to sell energy to the grid.

3.4 Monitoring Plan

The project applies the monitoring methodology established according to the simplified baseline methodology for category I.D small-scale CDM project activities. The main parameter is net electricity generated by the project. The amount of natural gas used is monitored to account for possible project emissions.

Detailed responsibilities and authorities for project management are sufficiently defined and procedures for monitoring and reporting and QA/QC procedures have been developed.

3.5 Calculation of GHG Emissions

The baseline calculations are according to the simplified baseline methodology for category I.D.: The average of the "approximate operating margin - OM" and the "build margin - BM" which is calculated ex ante based on 2001-2003 data from ONS for the S-SE-CO grid.

The "approximate operating margin" coefficient obtained is 0.949 $kgCO_2e/kWh$. The "build margin" coefficient obtained is 0.094 $kgCO_2e/kWh$. The combined margin coefficient is thus 0.521 $kgCO_2e/kWh$.

Emissions from the use of blast furnace gas are not accounted for as they are the same in the baseline and the project scenario. There are no emissions associated with the production of wood tar, and the emissions associated with the transport of the tar from producing sites to the Barreiro plant can be considered insignificant. These were estimated to account for less than 0.25% of the project's total emission reductions.

The emissions of the project are limited to the consumption of natural gas at the Barreiro plant. The amount of gas consumed will be measured, and total project emission (EmP) are calculated as follows:

$$EmP = CC\ (C/GJ) \times En\ (GJ) \times Ox\ (\%) \times (44/12) / 1{,}000$$

Where:

CC is the carbon content in natural gas of 15.3 kg C/GJ (IPCC 1996 guideline),
En is the total energy supplied by the natural gas in GJ (Estimated to be 75,366 GJ/year),
Ox is the oxidation factor for natural Gas of 0.995 (IPCC 1996 guideline).

3.6 Leakage

According to the simplified baseline & monitoring methodology for category I.D, leakage shall only be considered if the project requires transfer of energy technology from another activity. This is not the case as the project is constructed with new equipment. Hence, the project is not expected to result in leakage.

3.7 Environmental Impacts

Prior to constructing the renewable energy plant, a series of legal steps must be undertaken. An EIA-RIMA (Environmental Impact Assessment – Environmental Impact Report) was prepared. This document includes detailed information about the project and is prepared for the attention of authorities as well lay people. Eventually, the state environment agency (FEAM/COPAM) issued a Building/Installation and Operation License for the plant. Compliance with the requirements stated in this license were assessed during site visit and found satisfactory.

3.8 Comments by Local Stakeholders

According to Resolution 1 of the Brazilian Inter-ministerial Commission for Global Climate Change, the CDM project invited selected local stakeholders to comment on the project. The relevant stakeholders were invited by letters. No comments were received from local stakeholders.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

DNV published on 19 August 2003 the PDD of May 2003 on the DNV Climate Change web site (http://www.dnv.com/certification/ClimateChange). Through the Climate-L mail list Parties, on 19 September 2003 stakeholders and non-governmental organizations were invited to comment on the validation requirements. No comments were received during this period.

Following DNV's accreditation as a DOE, the PDD was republished on the DNV Climate Change web site. Parties, stakeholders and NGOs were through the UNFCCC CDM website invited to provide comments on the validation requirements during a 30 days period from 2 September 2004 to 2 October 2004. One comment was received during this period. The comment (in unedited form) and DNV Certification's response is given below.

Comment by: Axel Michaelowa, Hamburg Institute of International Economics (HWWA)
Inserted on: 2004-09-17
Subject: Comment on barrier test and build margin

Comment:

The argument for the investment barrier is very superficial and has to be supported with quantitative financial data, particularly given that the planning of the project was already done in the late 1990s when the CDM was not yet a driving force for such investments.

The use of the IEA study BM data is not acceptable, as the IEA in 2001/2 could obviously not calculate the BM according to the 2004 rules for the BM (EB revision of March 2004 changing the rules for the BM)

The latter tends to overestimate the baseline emission factor

DNV Certification's response:

Both issues raised by the comment were considered in DNV's validation of the project.

In DNV's opinion, the technological barriers presented in the PDD sufficiently demonstrate that the project is not a likely baseline scenario and no further financial data for assessing the presented investment barrier was thus requested.

In the revised PDD of August 2005, the operating margin and build margin were calculated according to the methodology given in the simplified baseline and monitoring methodologies for category I.D small-scale CDM project activities.

5 VALIDATION OPINION

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the "UTE Barreiro S.A. Renewable Electricity Generation Project" at Belo Horizonte, Minas Gerais State, Brazil (hereafter called "the project"). The validation was performed on the basis of UNFCCC criteria for small-scale CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The project participants are Vallourec & Mannesmann Tubes (Brazil) and EcoSecurities (UK). All Parties involved, i.e. Brazil and the United Kingdom, meet the requirements to participate in the CDM.

The proposed thermoelectric power project with a capacity of 12.9 MW will generate electricity utilizing blast furnace gas of the integrated Barreiro steel plant and wood tar from charcoal.

The project is not expected to have considerable environmental impacts. An Environmental Impact Study as required by Brazilian law has been carried out and the project has received the environmental licences by FEAM/COPAM.

By promoting renewable energy, the project is in line with the current sustainable development priorities of Brazil. Nevertheless, the Brazilian DNA has not yet confirmed that the project assists Brazil in achieving sustainable development.

Being a renewable energy project activity with an output capacity of less than 15 MW, the project meets the criteria for Renewable electricity generation for the grid (Category I.D) as defined in Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

The electric energy generated by the project will be used by the integrated Barreiro steel plant and will reduce the imports from grid electricity and thus displace energy from the grid. As this project activity reduces grid electricity imports and thus avoids marginal fossil fuel based electricity generation, DNV is in favour of the project being considered under category I.D. This is, however, subject to the final acceptance of the CDM Executive Board.

The project applies the appropriate simplified baseline methodologies proposed for these small-scale project activity categories. A combined margin emission coefficient of 0.521 tCO_2e/MWh is calculated in accordance with the simplified baseline methodology for category I.D small-scale CDM project activities, i.e. the average of the approximate operating margin and the build margin. The determination of this combined margin emission coefficient is based on actual electricity generation data provided by the National Electricity System Operator (ONS) for the years 2001- 2003 in the South-Southeast-Midwest (S-SE-CO) grid. Although the ONS data only covers 76.4% of the installed capacity in the S-SE-CO grid, the ONS data represents the best available data on the Brazilian grid and the most recent statistics available at the time of PDD submission. No electricity generation data is publicly available for the remaining 23.6% of power plants which electricity is not dispatched through ONS. However, these plants are not likely to be affected by a CDM project. They operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access. Moreover, the calculated build margin

emission coefficient is more conservative than the emission coefficient calculated in an IEA study.

The additionality of the project is demonstrated through a barrier test. The presented technological and investment barriers demonstrate the project is not a likely baseline scenario.

By displacing fossil fuel-based electricity, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions.

The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.

In summary, the UTE Barreiro S.A. Renewable Electricity Generation Project meets all present and relevant UNFCCC criteria and the simplified modalities and procedures for small-scale CDM project activities.

In summary, it is DNV's opinion that the "UTE Barreiro S.A. Renewable Electricity Generation Project" as described in revised and resubmited project desing document of August 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodologies for category I.D small-scale CDM project activity. Hence, DNV will requests the registration of the "UTE Barreiro S.A. Renewable Electricity Generation Project" as CDM project activit

Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of the participating Parties, including confirmation by the DNA of Brazil that the project assists in achieving sustainable development.

6 REFERENCES

Category 1 Documents:

Documents provided by MGM International that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the validation conclusions.

/1/ UTE Barreiro SA Small Scale CO_2 Project PDD, version August 2003

/2/ UTE Barreiro SA Small Scale CO_2 Project PDD, version December 2004

/3/ UTE Barreiro SA Small Scale CO_2 Generation Project PDD, version May 2005

/4/ UTE Barreiro SA Small Scale CO_2 Generation Project PDD, version August 2005

/5/ Spreadsheet of Calculation of Combined Margin (ONS database SSC 2001-2003 v.05.xls), 26 May 2005.

Category 2 Documents:

/6/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities, *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories,* (Version 05 of 25 February 2005).

/7/ Martina Bosi: *Road-Testing Baselines for Greenhouse Gas Mitigation Projects in the Electric Power Sector* (OECD and IEA Information Paper COM/ENV/EPOC/IEA/SLT(2002)6). October 2002. Available at http://www.oecd.org.

/8/ International Emissions Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

Persons interviewed:

/9/ Sergio Ceriassi F.M – V&M Energy and Utilities Manager

/10/ Eduardo Botelho – V&M Controler of Energy and Utilities Dep.

/11/ Flavia A. Resende – Ecosecurities Consultor

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APPENDIX A

VALIDATION PROTOCOL
FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirement for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Table 2, Section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	----	Table 2, Section A.3 Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written confirmation by the DNA of Brazil that the project assists in achieving sustainable development.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	----	Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive the written approval of voluntary participation from the DNA of the participating Parties.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1

Requirement	Reference	Conclusion	Cross Reference/ Comment
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7)	OK	The project is funded by equity from the project sponsors (V&M, CEMIG,). No ODA funding is used.
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29)	OK	The Brazilian DNA is the Comissão Interministerial de Mudança Global do Clima. The DNA of the UK is the Department for Environment, Food and Rural Affairs.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30)	OK	Brazil ratified the Kyoto Protocol on 23 August 2002. The UK ratified the Kyoto Protocol on 31 May 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures § 30, 31b	OK	The UK's assigned amount is 92% of its 1990 emissions.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	The UK has in place a national registry and reported on 15 April 2004 its national GHG inventory for the years 1990-2002.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The document is as per the SSC PDD format (Version 01).
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project	Simplified Modalities and Procedures for Small Scale	OK	Table 2, Section A.1.3 and B.1

Requirement	Reference	Conclusion	Cross Reference/ Comment
activities and uses the simplified baseline and monitoring methodology for that project category	CDM Project Activities §22e		
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD has been published on www.dnv.com/certificatin/ClimateChage on 19 August 2003. The same day Parties, stakeholders and NGOs have been invited through the Climate-L mailing list to provide comments on the validation requirement during a period of 30 days until 18 September 2003. No comments were received in this period. Following DNV's DOE accreditation, the PDD was republished on www.dnv.com/certificatin/ClimateChage and Parties, stakeholders and NGOs were through the UNFCCC CDM website invited to provide comments on the validation requirements during a 30 days period from 2 September 2004 to 2 October 2004. One comment was received during this period.

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. **Project Description** The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	Being a renewable energy project activity with an output capacity of less than 15 MW, i.e. 12,9 MW, the project qualifies as a small-scale CDM project activity according to category (i) defined in paragraph 6, subparagraph (c) of decision 17/CP.7 on the modalities and procedures for the CDM, and included on Type/Category I.D of Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The steel production at the Barreiro plant uses charcoal as reducing agent and the charcoal is obtained from Forest Stewardship Council (FSC) certified, sustainable managed eucalyptus plantations. Hence, the blast furnace gas and the wood tar used for generating energy can be considered as renewable energy. Similarly, as the wood tar is obtained as a by-product from sustainable charcoal production it can be considered a renewable source of energy. Project category I.D comprises projects that "that supply electricity to an electricity distribution system". The electric energy generated by the project will be used by		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			V&M Barreiro's Integrated Steel Plant and will reduce the imports from grid electricity and thus displace energy from the grid. As this project activity reduces grid electricity imports and thus avoids marginal fossil fuel based electricity generation, DNV is in favour of the project being considered under Category I.D. This is, however, subject to the final acceptance of the CDM Executive Board with regard to whether category I.D can also apply to projects that generate electricity for their own use.		
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	The project is not a debundled component of a larger project activity as demonstrated in the debundling occurrence analysis presented in the PDD. This is carried out according to Appendix C of the simplified modalities and procedures for small-scale CDM project activities. Two others projects represent different project categories (Fuel Switching and Land Use Change).		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/	DR	The project is a "Renewable electricity generation for a grid project activity" (Type I.D) as defined in the simplified modalities and procedures for small-scale CDM project activities.(Refer A1.2)		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project is located at Belo Horizonte, Minas Gerais State, Brazil, and the electricity generation unit is installed inside Barreiros's Integrated Steel Plant. The project boundaries are established according to the simplified baseline and monitoring methodologies for category I.D small-scale CDM project activities. Wood tar production and transportation of wood tar were not considered.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR	The project comprises a 12.9 MW thermoelectric plant on Barreiro's Integrated Steel Plant, using excess blast furnace gas and wood-tar from charcoal. The electric energy will be used on Barreiro's Integrated Steel Plant to displace energy from the grid.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR	The project design engineering reflects good practice, especially in the context of the use of excess blast furnace gas to produce electric energy and the use of wood tar in order to complete the fuel requirements. Furthermore, the operations are computer controlled.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	No. The operator will be the electric energy concessionaire -CEMIG- which has a lot experience with gas and fuel generators.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions	/1/	DR	CEMIG will be in charge of the operation. CEMIG is an electric utility company which has good experience with operation of power plants.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
for meeting training and maintenance needs?					
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project is likely to reduce pollution from fossil-based electricity generation, reduce tar vapour emissions and optimise the use of energy at the Barreiro Plant. The project creates 100 jobs on construction and 16 in operation.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR	No		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The project is in line with current sustainable development priorities in Brazil.	------	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR/I	The project complies with environmental legislation according to the Operational Environmental Licence number LO 487/03 issued by the Environmental Agency (FEAM/COPAM) and relevant legal requirements on electric generation according to the Federal Electric Agency (ANEEL) through participant CEMIG.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B. **Project Baseline** The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The project applies one of the simplified baseline methodologies proposed for this project activity category I.D.(Renewable electricity generations for the grid) , i.e. the average of the approximate operating margin and the build margin.(Refer also A1.1).		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Yes (Refer A1.1)		OK
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/	DR	The project is the first to use excess blast furnace gas in a charcoal steel plant instead of flaring it and to recover and use wood tar as complementary combustible instead of releasing it as vapours to the atmosphere during the charcoal production. A barriers test including three different scenarios and technological, financial and prevailing business practice		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			barriers demonstrate that construction of a renewable fuel generator is not a likely baseline scenario.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR	The selected baseline is the average of the build margin and the approximate operating margin. The baseline determination is based on an International Energy Agency (IEA) study for Brazil (Bosi et al, October 2002) in which emission factors for the operation margin and build margin are calculated based on compiled data on 1,479 plants, in operation (1,174) or under construction (305) as of July 3, 2002. The data obtained for the South-Southeast and Mid-West grid were used. In order to adequate the operation margin to the Brazilian grid, witch has hydro predominance, a reduction factor was implemented using ANEEL/ONS figures. However this methodology differs from the methodology proposed for category I.D small-scale CDM project activities. It was extracted from the methodology proposed for the Vale do Rosário Project (NM0016-rev). This methodology was eventually approved as AM0015. However, the methodology for calculating the operating and build margin is different from the one originally proposed for the Vale do Rosário Project and hence the one applied by the project. The project proponents are thus requested to calculate the operating and build margin according to the methodology given in the simplified baseline and monitoring methodologies for category I.D small-scale CDM project activities.	~~CAR1~~	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	Yes, the developments in the Brazilian power sector are sufficiently taken into account.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/ /3/	DR	No, according to paragraph 29 (a) of Appendix B to the simplified modalities and procedures for small-scale CDM project activities, the baseline must be recalculated.	~~CAR1~~	OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/	DR	Yes, See B.2.1		OK
C. **Duration of the Project / Crediting Period** It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/	DR	The project's starting date is 1 December 2003 and the expected operation lifetime of the project is more than 30 years.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	A renewable crediting period of 7 years starting on 1 January 2004 is selected.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
***D.* Monitoring Plan** The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/	DR	The monitoring methodology is according to the monitoring methodology provided category I.D projects and includes other relevant parameters.		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	The proposed monitoring methodology complies with the monitoring methodology proposed for category I.D projects.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	Yes, The monitoring plan proposes to monitor the electricity generated by the project, blast furnace gas and wood-tar consumption. The monitoring plan establishes/updates the baseline emission factors every 7 years for the revalidation of the baseline.		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	Yes		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Are the choices of project emission indicators reasonable?	/1/	DR	The project considers potential use of natural gas during absence of blast furnace gas and wood tar.		OK
D.2.2. Will it be possible to monitor / measure the specified project emission indicators?	/1/	DR	Yes.		OK
D.2.3. Do the measuring technique and frequency comply with good monitoring practices?	/1/	DR	Monthly monitoring represents good monitoring practise.		OK
D.2.4. Are the provisions made for archiving project emission data sufficient to enable later verification?	/1/	DR	Data will be kept during the whole crediting period + 2 years.		OK
D.3. Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?	/1/	DR	Since the renewable energy technology does not represent equipment transfer from another activity, no leakage calculations are required for category I.D project activities.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	The baseline will be revalidated prior to each new crediting period.		OK
D.4.2. Will it be possible to monitor / measure the specified baseline emission indicators?	/1/	DR	Yes, through figures from ANEEL/ONS.		OK
D.4.3. Do the measuring technique and frequency comply with good monitoring practices?	/1/	DR	Acceptable.		OK
D.4.4. Are the provisions made for archiving baseline emission data sufficient to enable later verification?	/1/	DR	Yes.		OK
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/	DR	The project is developed by V&M do Brasil SA, as carbon credit owner and energy supplier, CEMIG as thermoelectric plant owner, and Ecosecurities as project CO2 advisor. The operation will be shared by V&M do Brasil SA and CEMIG and monitoring will be carried out by UTE Barreiro SA / V&M do Brasil SA.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR	Monitoring will be carried out by UTE Barreiro SA / V&M do Brasil SA.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR I	The operator is CEMIG with experience from similar projects.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Natural gas consumption, in case of non-availability of blast furnace gas, will be monitored.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	The operator CEMIG has experience with similar projects.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	The operator CEMIG has experience with similar projects.		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	CEMIG, as project operator, will be responsible for data collection and V&M for data check and correction		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	See D.5.7		OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	See D.5.7		OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR	See D.5.7		OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	See D.5.7		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR	See D.5.7		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E. **Calculation of GHG emission** It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	The project considers emissions from the use of natural gas when blast furnace gas is not available. There are no emissions associated to the production of wood tar, and the emissions associated to the transport of the tar from producing sites to the Barreiro plant can be considered insignificant, accounting for less than 0.25% of the project's total emission reductions.		OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Methane emissions will not be modified by the project, since blast furnace gas is burned in the project scenario as well as the baseline scenario. N_2O, HCFCs, PFCs and SF_6 are not applicable to the project		OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/1/	DR	The methodologies for calculating emissions comply with one of the approaches proposed for category 1D project categories.		OK
E.1.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	Yes.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.1.5. Have conservative assumptions been used?	/1/	DR	Yes.		OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	The emissions from wood-tar transportation (0,25%) was considered insignificant and hence not considered.		OK
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	According to the simplified baseline & monitoring methodology for category I.D, leakage shall only be considered if the project requires transfer of energy technology from another activity. This is not the case as the project is constructed with new equipment. Hence, the project is not expected to result in leakage.		OK
E.3. Baseline GHG Emissions The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emissions boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	The baseline boundaries are confined by the generation unit at Barreiro's Integrated Steel Plant. The grid considered for determining the operating and build margin is the South-Southeast grid.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	All direct baseline emissions are captured. Indirect baseline emissions are insignificant and hence not considered.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes see E.1.2		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	The methodology complies with one of the approaches proposed for category I.D project activities. However the methodology AM0015 originally established a different approach on the operating margin calculation.	~~CAR1~~	OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	The calculations are documented in a complete and transparent manner.		OK
E.3.6. Have conservative assumptions been used?	/1/	DR	The emission factor for grid electric energy generation considers the operating and build margin of the region S-SW grid, and does not consider the grid of Santa Catarina State where there is a higher amount of coal-based generation units.		OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	Uncertainties are sufficiently addressed where applicable.		OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR	The project reduces the consumption of fossil fuel based electricity generation by using renewable sources such as blast furnace gas and wood tar.		OK
F. **Environmental Impacts** It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of	/1/	DR	Yes, the Environmental Impact Assessment-Environmental Impact Report (EIA-RIMA) was		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
the project activity?			conducted & presented to the State Environmental Agency (FEAM / COPAM). According to environmental law, public & stakeholder opinion was taken into consideration as a prelude to obtain the Operation Environmental Licence (LO).		
F.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR	The Operation Licence requirements are met.		OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	No, all potential impacts like air pollution & noise have already been addressed as part of requirements given in the licence conditions.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	The environmental impacts of the project are sufficiently assessed and necessary mitigation measures considered.		OK
***G.* Comments by Local Stakeholder** Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	Various stakeholders represented by the city hall, environmental agencies, Brazilian forum of NGO's, local communities & district attorney were consulted as per requirements of the Brazilian DNA for CDM projects.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	It was communicated through Letters (fax or email).		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR	See G.1.1		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
G.1.4. Is a summary of the comments received provided?	/1/	DR/I	No comments were received.		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR	See G.1.4		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participant's response	Validation conclusion
CAR 1: The baseline determination is based on an International Energy Agency (IEA) study for Brazil (Bosi et al, October 2002) as applied by the methodology proposed for the Vale do Rosário Project (NM0016-rev). This methodology was eventually approved as AM0015. However, the methodology for calculating the operating and build margin is different from the one originally proposed for the Vale do Rosário Project and hence the one applied by the proposed project.	B.2.2 B.2.4 E.3.4	*Operating Margin:* The methodology for category I.D SSC projects states that "the approximate operating margin is the weighted average emissions (in kg CO2equ/kWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation." The calculation of the operating margin used in the PDD is more conservative than the required by the I.D methodology for Small Scale Projects. This is because the methodology allows the exclusion of all hydro and the PDD considers 7.6 % of hydro being at the margin. *Build Margin* The methodology for category I.D SSC projects states that "the build margin is the weighted average emissions (in kg CO2equ/kWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants." The Built Margin calculated in the PDD uses the 20% most recent existing plants	The operating margin is not calculated according to an approved methodology (Note: The approach for identifying the % of hydro that can be excluded from the operating margin proposed by NM0001-rev was not approved and the approach of the consolidated methodology was included in NM0015). However, the small-scale methodology allows to exclude all hydro and does not require an analysis of hydro that must be considered as being part of the operating margin. Therefore, the calculation of the operating margin for the proposed project is more conservative than if calculated with the category I.D small-scale methodology and thus acceptable. It remains to be demonstrated that the build margin calculated for the project is calculated in accordance with the methodology for calculating the build margin given for category I.D small-scale CDM project activities. If the calculation is different, this must be discussed and justified and it must demonstrated that the build margin calculated for the proposed project is

Report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participant's response	Validation conclusion
		(116 out of 582 plants) since, in the case of, the Brazilian grid, the amount of MWh of 116 plants (20% most recent existing plants) will definitely be higher than the amount MWh of any 5 most recent plants.	more conservative.
CAR 1 (continued): The project proponents are requested to calculate the operating and build margin according to the methodology given in the simplified baseline and monitoring methodologies for category I.D small-scale CDM project activities. If the calculation is different, this must be discussed and justified and it must demonstrated that the combined margin calculated for the proposed project is more conservative.		We had to use the IEA report because there have been many barriers to getting data from the Brazilian grid. Since we did not have access to their database we had to rely on their calculation method and had very little flexibility to adapt it in order to be 100% in accordance with the small scale methodology. To solve this problem we got in contact with IEA and managed to obtain the database they used to do their calculation. So, instead of using the IEA results, we recalculated the Build margin, the Operating margin, and the Combined margin again but, using their data and assumptions but applying the Small Scale methodology. We noticed that the EIA report calculated the operating margin (OM) using not only the operating plants but also the plants that would start operation in the following years (2003, 2004, 2005, and 2006). We decided to exclude the 2005 and 2006 plants from the OM calculation but to keep the 2003 and 2004 ones. Doing so we ended up with 435 plants (representing 62,860 MW of installed	OK. The determination of the combined margin is based on an International Energy Agency (IEA) study for Brazil. Considering that such study was carried out recently and that the necessary data for determining the operating and build margin is not public available in Brazil, the use of the data from the IEA study are deemed adequate for calculating the combined margin. The operating margin (the weighted average emissions of all generating sources serving the system excluding hydro, geothermal, wind, low-cost biomass nuclear and solar generation) and build margin (most recent 20% capacity additions to the system) were calculated according to the methodology given in the simplified baseline and monitoring methodologies for category I.D small-scale CDM project activities. It remains to be demonstrated that the build margin calculated for the Bareiro project is calculated in accordance with

Report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participant's response	Validation conclusion
		capacity) for the calculation of the OM for the S-SE grid (instead of the 582 used by EIA). The build margin (BM) was also recalculated using the most recent plants to a total of 12,856 MW (83 plants representing 20% of the installed capacity).	the methodology for calculating the build margin given for category I.D small-scale CDM project activities. If the calculation is different, this must be discussed and justified and it must demonstrated that the build margin calculated for the Irani project is more conservative.
CAR 1 (continued): The project proponents are requested to calculate the operating and build margin according to the methodology given in the simplified baseline and monitoring methodologies for category I.D small-scale CDM project activities. If the calculation is different, this must be discussed and justified and it must demonstrated that the combined margin calculated for the Irani project is more conservative.		The Brazilian electricity system nowadays comprises of around 98,8 GW of installed capacity, in a total of 1.420 electricity generation enterprises. Approved methodologies AM0015 and ACM0002 ask project proponents to account for "all generating sources serving the system". In that way, when applying one of these methodologies, project proponents in Brazil should search for, and research, all power plants serving the Brazilian system. In fact, information on such generating sources is not publicly available in Brazil. The national dispatch center, ONS – Operador Nacional do Sistema – argues that dispatching information is strategic to the power agents and therefore cannot be made available. On the other hand, ANEEL, the electricity agency, provides information on power capacity and other legal matters on the electricity sector, but no dispatch or generation information can be got through this entity.	OK. Although the ONS data only covers 76.4% of the installed capacity in the S-SE-CO grid, the recalculation of the operating and build margin emission coefficient based on actual dispatch data from ONS represents an improvement of the data quality compared to the data from the IEA study on the Brazilian electricity grid carried out in 2002 (using data from 2000). The IEA study was based on installed capacity of plants built up to 2004 and assumptions regarding the plant efficiency and load factor. The revised combined margin emission coefficient of 0.521 tCO_2e/MWh is calculated in accordance with the simplified baseline methodology for category I.D small-scale CDM project activities based on electricity generation data provided by ONS for the S-SE-CO grid in the years 2001-2003 (Data for

Report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participant's response	Validation conclusion
		In that regard, project proponents looked for a plausible solution in order to be able to calculate the emission factor in Brazil in the most accurate way. Since real dispatch data is necessary after all, the ONS was contacted, in order to let participants know until which degree of detail information could be provided. After several months of talks, plants' daily dispatch information was made available for years 2001, 2002 and 2003. According to ANEEL, in fact, ONS centralized dispatched plants accounted for 75.547 MW of installed capacity by 31/12/2004, out of the total 98.848,5 MW installed in Brazil by the same date (http://www.aneel.gov.br/arquivos/PDF/Resumo_Gráficos_mai_2005.pdf). Therefore, even though the emission factor calculation is carried out without considering all generating sources serving the system, about 76,4% of the installed capacity serving Brazil is taken into account, which is a fair amount if one looks at the difficulty in getting dispatch information in Brazil. Moreover, the remaining 23,6% are plants that do not have their dispatch coordinated by ONS, since: either they operate based on power purchase agreements which are not under control of	the years 2001-2003 are the most recent statistics available). Average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid and IPCC carbon emission factors for specific fuels were used to calculate plant specific emission coefficients. The recalculated combined margin emission coefficient of 0.521 tCO_2e/MWh is appropriate due to the following: - Operating margin: No electricity generation data is publicly available for the remaining 23.6% of power plants which electricity is not dispatched through ONS. However, these plants are not likely to be affected by CDM project. They operate either based on power purchase agreements which are not under control of the dispatch authority, or they are located in non-interconnected systems to which ONS has no access. Hence, the power plants dispatched by ONS are representative for the operating margin. - Build margin: The build margin emission coefficient calculated for only power plants dispatched by ONS is more conservative than the emission

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		the dispatch authority; or they are located in non-interconnected systems to which ONS has no access. In that way, this portion is not likely to be affected by the CDM projects, and this is another reason for not taking them into account when determining the emission factor. In the end, the approach of having ONS information only in the calculation of the combined margin emission factor for the Brazilian grid appeared to project proponents as the most transparent, conservative and reasonable. The combined margin factor was already revised and corrected. We have adopted the 0.521 tCO2/MWh agreed and also the ERs were corrected. The Brazilian electricity system has been historically divided into two subsystems: the North-Northeast (N-NE) and the South-Southeast-Midwest (S-SE-CO). This is due mainly to the historical evolution, which was naturally developed nearby the biggest consuming centers of the country and to the large distances between these consuming centers. The national dispatch center, ONS – *Operador Nacional do Sistema* – and technical papers divides the Brazilian system in two (Bosi, 2000 and Bosi, 2002): Moreover, Bosi (2000) gives a strong	coefficient calculated based on IEA data or IEA data combined with ONS data. - Project electricity system: Even though the S-SE-CO grid is connected with the N-NE grid, the energy flow between N-NE and S-SE-CO grids are heavily limited by the transmission lines capacity. Hence, it is appropriate to consider data on the S-SE-CO grid only.

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		argumentation in favor of dividing the grid of large countries: "*For large countries with different circumstances within their borders and different power grids based in these different regions, multi-project baselines in the electricity sector may need to be disaggregated below the country-level in order to provide a credible representation of 'what would have happened otherwise*" Finally, one has to take into account that even though the systems today are connected, the energy flow between N-NE and S-SE-CO is heavily limited by the transmission lines capacity. Therefore, only a fraction of the total energy generated in both subsystems is sent one way or another. The regions S and SE-CO are heavily interconnected. There are 8 large transmissions lines (4 of 230 Kv, 3 of 500Kv and 1 of 750 Kv. Data from *Revista Brazil Energia*, n°276, November 2003. See annexed map) and many small ones, do not presenting significant emissions constrains. On the other hand, the systems N-NE and S-SE-CO presents only one transmission line of 500 Kv, interconnecting Goias to Tocantins. Considering these facts, the project boundary will be limited to the system S-SE-CO, and not the entire interconnected system.	

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		References: Bosi, M. *An Initial View on Methodologies for Emission Baselines: Electricity Generation Case Study*. International Energy Agency. Paris, 2000. Bosi, M. *Road-testing baselines for greenhouse gás mitigation projects in the electric power sector.* International Energy Agency. Paris, 2002.	

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