



---

# VALIDATION REPORT

---

## USINAS ITAMARATI COGENERATION PROJECT IN BRAZIL

REPORT No. 2005-1380

REVISION No. 01

DET NORSKE VERITAS



## VALIDATION REPORT

Date of first issue: 2005-11-10	Project No.: 28624550 (41)
Approved by: Einar Telnes Technical Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Usinas Itamarati S.A.	Client ref.: Caetano Henrique Grossi

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) has performed a validation of the “Usinas Itamarati Cogeneration Project” (hereafter called “the project”) in Brazil on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design, 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 “Usinas Itamarati Cogeneration Project” project, as described in the revised PDD of 16 November 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0015. Hence, DNV will request the registration of the “Usinas Itamarati Cogeneration Project” project as a 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 the DNA of Brazil, including confirmation that the project assists in achieving sustainable development.

Report No.: 2005-1380		Subject Group: Environment					
Report title: Usinas Itamarati Cogeneration Project							
Work carried out by: Vicente San Valero, Cintia Dias, Luis Filipe Tavares							
Work verified by: Michael Lehmann							
Date of this revision: 2005-11-17	Rev. No.: 01	Number of pages: 13					
<b>Indexing terms</b> <table border="1"> <tr> <td rowspan="3">           Key words            Climate Change            Kyoto Protocol            Validation            Clean Development            Mechanism         </td> <td>Service Area Verification</td> </tr> <tr> <td>Market Sector</td> </tr> <tr> <td>Process Industry</td> </tr> </table>				Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification	Market Sector	Process Industry
Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification						
	Market Sector						
	Process Industry						
<input checked="" type="checkbox"/> No distribution without permission from the client or responsible organisational unit <input type="checkbox"/> free distribution within DNV after 3 years <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution							
2002 Det Norske Veritas AS All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.							



<i><b>Table of Content</b></i>	<i><b>Page</b></i>
1 INTRODUCTION .....	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Usinas Itamarati Cogeneration Project	1
2 METHODOLOGY .....	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
3 VALIDATION FINDINGS .....	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Project Baseline	6
3.4 Additionality	6
3.5 Monitoring Plan	7
3.6 Calculation of GHG Emissions	8
3.7 Environmental Impacts	9
3.8 Comments by Local Stakeholders	9
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS .....	9
5 VALIDATION OPINION .....	11
REFERENCES .....	13

## [Appendix A Validation Protocol](#)



## ***Abbreviations***

ANEEL	Agência Nacional de Energia Elétrica (National Agency Electric Energy)
BAU	“Business as usual”
BNDES	Brazilian National Bank for Economic and Social Development
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
FEMA	Fundação Estadual do Meio Ambiente (Mato Grosso Environmental Agency)
CH <sub>4</sub>	Methane
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CEMAT	Centrais Elétricas Mato-Grossenses S.A. (Regional Electricity Company)
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N <sub>2</sub> O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
ONS	Operador Nacional do Sistema Elétrico (National Electricity System Operator)
PDD	Project Design Document
PROINFA	Programme of Incentives to the Alternative Sources of Electric Energy
S-SE-CO	South-Southeast-Midwest (a regional grid in Brazil)
SEMA	Secretaria de Estado do Meio Ambiente (Mato Grosso State Environmental Secretary)
UNFCCC	United Nations Framework Convention on Climate Change



## 1 INTRODUCTION

Usinas Itamarati S.A. and Ecoinvest have commissioned Det Norske Veritas Certification Ltd. (DNV) to perform a validation of the “Usinas Itamarati Cogeneration Project”, located in the municipality of Nova Olímpia, Mato Grosso State, Brazil.

This report summarises the findings of the validation of the project, performed based on UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Mr. Luis Filipe Tavares	DNV Rio de Janeiro	Team leader
Mr. Vicente San Valero	DNV Rio de Janeiro	CDM auditor
Mrs Cintia Dias	DNV Rio de Janeiro	CDM auditor
Mr. Michael Lehmann	DNV Oslo	Energy sector expert, Technical reviewer

### 1.1 Validation Objective

The purpose of a validation is to have an independent third party assessing the project design. In particular, the project's baseline, the 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 Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakesh Accords and relevant decisions by the CDM Executive Board. The validation team has employed, based on the recommendations in the Validation and Verification Manual /4/ 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 corrective actions may provide input for improvement of the project design.

### 1.3 Usinas Itamarati Cogeneration Project

The “Usinas Itamarati Cogeneration Project” is located in the municipality of Nova Olímpia, Mato Grosso State, Brazil. The project involves an increase of the bagasse cogeneration facility at the Usinas Itamarati S.A. sugar cane mill, allowing the mill to supply excess electricity to the grid.

The project has already been implemented and started operation on 01 September 2001.

With the implementation of this project, the mill is able to sell surplus electricity to the regional South-Southeast-Midwest (S-SE-CO) grid, avoiding thus the dispatch of the same amount of electricity partly generated by thermal power plants supplying electricity to that grid. The



estimated amount of GHG emission reductions from the project is 58 147 tonnes CO<sub>2</sub> equivalents (tCO<sub>2</sub>e) during the first renewable 7-year crediting period (with the potential of being renewed twice), resulting in estimated average annual emission reductions of 8 307 tCO<sub>2</sub>e.

## 2 METHODOLOGY

The validation consisted of the following three phases:

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

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /4/. 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 for the “Usinas Itamarati Cogeneration Project” is enclosed in Appendix A to this report.

Findings established during the validation can be seen as either 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 request for *Clarification* (CL) may be used where additional information is needed to fully clarify an issue.



<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>			
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>	<b>Cross reference</b>
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 ( <b>OK</b> ), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.	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.

  

<b>Validation Protocol Table 2: Requirement Checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
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 ( <b>OK</b> ), or a <b>Corrective Action Request (CAR)</b> due to non-compliance with the checklist question (See below). A request for <b>Clarification (CL)</b> is used when the validation team has identified a need for further clarification.

  

<b>Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification</b>			
<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
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 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 (PDD) /1/ of 29 September 2005 submitted by Usinas Itamarati S.A. and Ecoinvest was assessed by DNV. Moreover, a revised version of the PDD /2/ dated 16 November 2005 which was submitted to address DNV's initial validation findings were subsequently assessed by DNV. In addition, spreadsheets containing detailed calculations for the combined margin emission coefficient /3/, which is applied by the project were assessed.

Other documents, such as the Environmental Licences and licence requirements as well as the letters sent to local stakeholders, were reviewed during the follow up interviews in order to ensure the accuracy of the provided information

## 2.2 Follow-up Interviews

On 14 November 2005 DNV performed interviews with representatives of Ecoinvest

The main topics of the interviews were

- Environment licenses compliance,
- Local stakeholders consultation process,
- Additionality argumentation,
- Cash flow analysis and IRR,
- Baseline emission calculations,
- Monitoring, reporting and QA/QC procedures - Calibration requirements,
- The possibility of leakage effects due to a possible practice of selling bagasse in the past.

## 2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation is to resolve any outstanding issues, which need to be clarified for DNV's positive conclusion on the project design.

The initial validation of the project identified 01 (one) *Corrective Action Requests* and 06 (six) requests for *Clarification*. These were presented to the project participant in the form of a draft validation report (rev. 0 dated 10 November 2005). The project participant's response to DNV's initial findings, which also included the submission of a revised PDD dated 16 November 2005, addressed the raised *Corrective Action Requests* and requests for *Clarifications* to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised are summarised in chapter 3 below and documented in more detail in the validation protocol in Appendix A.





### 3 VALIDATION FINDINGS

The findings of the validation of the “Usinas Itamarati Cogeneration Project” 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 validation findings relate to the project design as documented and described in the PDD of 16 November 2005.

#### 3.1 Participation Requirements

The project participant is Usina Itamarati S.A. of Brazil. The host Party Brazil meets all relevant participation requirements. No participating Annex I Party is yet identified.

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

#### 3.2 Project Design

The project is a grid-connected renewable energy project activity, displacing grid electricity that is partly generated based on fossil fuels, with electricity generated from renewable sources (bagasse) and thus resulting in the reduction of emissions of greenhouse gases in the energy sector. The project increased the efficiency and capacity of the prevailing bagasse based energy generation, by adding new high-pressure boilers and by installing an additional 34 MW generation capacity. This capacity addition will allow for generation of excess electricity to be dispatched to the regional S-SE-CO grid.

The project design engineering reflects good practice through the use of the steam Rankine cycle technology for steam and power generation.

As per ANEEL Resolution No. 323/01 (dated 13/08/2001), the total installed capacity for Usinas Itamarati S.A. is 28 MW. This does correspond the total installed capacity of 38 MW mentioned in the PDD. During follow-up interview, complementary information was provided to explain the difference between the capacity stated in the PDD and ANEEL Resolution No. 323/01. It was argued that ANEEL Resolution No.232/01 refers to the old design of the project, and the ANEEL Resolution is expected to be updated soon with regard to the actual design of the project (Usinas Itamarati S.A. replaced a generator of 4 MW capacity with a new one of 18 MW capacity. This change was communicated to ANEEL and as it is the this project expansion, it is that is considered as a CDM additional capacity). As the permission to sell electricity was issued by ANEEL and a Power Purchase Agreement could only be signed with a valid ANEEL Resolution, it is likely that a revised ANEEL Resolution stating the correct capacity will be issued soon. However, the revised ANEEL Resolution should be checked during the first verification of emission reductions from the project.

A 7-year renewable crediting period is selected (with the potential of being renewed twice), starting on 01 September 2001. The starting date of the project activity is also 01 September 2001. The expected operational lifetime of the project is 25 years.



The project's estimated emission reductions are 58 147 tCO<sub>2</sub>e (8 307 tCO<sub>2</sub>e /year on average) over the first 7-year renewable crediting period.

The project boundary is the site where the cogeneration facilities are located (Usinas Itamarati S.A.).

The project is expected to bring social (the Usina Itamarati complex directly employs around 3 861 workers), environmental (conservation, mitigation, and preservation of natural resources) and economic benefits, thus contributing to the sustainable development objectives of the Brazilian Government.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Brazil.

### 3.3 Project Baseline

The project applies the approved baseline methodology AM0015 - "Bagasse-based *cogeneration connected to an electricity grid*" /5/.

The project fulfils the conditions under which AM0015 is applicable. The baseline scenario is that the current practice continues, i.e. bagasse is not utilized to generate excess electricity to be supplied to the grid and an equivalent amount of electricity would in the absence of the project activity have been generated by the operation of grid-connected power plants and by the addition of new generation sources. In accordance with AM0015, an electricity baseline emission factor is calculated as a combined margin, consisting of the average of the operating margin (OM) and build margin (BM) emission factors (see section 3.6).

### 3.4 Additionality

In accordance with AM0015, the additionality of the project is demonstrated through the "*Tool for the demonstration and assessment of additionality*" /7/, which includes the following steps:

*Step 0 - Preliminary screening based on the starting date of the project activity:* The starting date of the CDM project activity, i.e. 01 September 2001, falls between 1 January 2000 and the date of the registration of the first CDM project activity (November 2004). This starting date was evidenced through the minutes of a meeting between Usinas Itamarati and the electricity company Rede/CEMAT.

Documented evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity was provided by means of a document named "Critical Analysis of the Itamarati's Thermo Plant" (May 2000) mentioning the possibility of CER revenues after the entering into force of the Kyoto Protocol.

*Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations:* The possible baseline scenarios are: a) Business as usual which means producing electricity and steam for self consumption with low efficiency and b) investing in the installation of new boiler(s) and installing a new electricity generator which will allow Usinas Itamarati S.A. to supply excess electricity to the grid. Both scenarios are in compliance with all applicable legal and regulatory requirements.

*Step 2 - Investment analysis:* Not applicable (Only Step 3 is selected)

*Step 3. Barrier analysis:* Investment, institutional and cultural barriers are presented in the PDD:



- a) *Investment barriers.* The project has a negative Net Present Value with a discount rate of 17% and the project's IRR is 15.15%. This average project IRR is lower than the SELIC rate in effect at the time of financing, i.e. 17.48% in 2001. The project is thus not financially attractive under normal commercial conditions in the absence of the CDM. DNV also confirmed as an investment barrier the fact that the revenues from selling electricity represent not more than 1% of the core business revenues of Usina Itamarati S.A., i.e. the production of sugar and alcohol. Electricity generation thus constitutes only a minor part of the project developer's total income. Given the above, it is sufficiently demonstrated that the project faces an investment barrier.
- b) *Institutional barriers.* DNV could confirm that the regulatory environment for the electricity sector changes a lot and often in Brazil, resulting in uncertainty for renewable energy generation. The project does not qualify for PROINFA, the Brazilian Programme of Incentives for Alternative Sources of Electric Energy, because it started operation before 2006.
- c) *Cultural barriers.* DNV was able to confirm that the sugarcane production is different from energy production and that electricity revenues only constitute a minor part of the project developer's total income. Hence, there are cultural barriers for sugarcane mills to invest in increased cogeneration capacity in order to supply excess electricity to the grid.

*Step 4 - Common practice analysis:* DNV was able to confirm that the efficient production of energy and heat by sugarcane mills is not common practice in Brazil. Usually the sugarcane mills produce energy inefficiently and do not supply excess electricity to the grid.

*Step 5 - Impact of CDM registration:* The project participants were able to demonstrate that the sale of CERs will provide the complementary incentives for the project to alleviate the above presented barriers.

Given the above and in particular the investment, institutional and cultural barriers the project faces, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are thus additional.

### 3.5 Monitoring Plan

The project applies the approved monitoring methodology AM0015 - "Bagasse-based cogeneration connected to an electricity grid" /5/.

The monitoring plan for determining emission reductions is based on monitoring the amount of electricity supplied to the grid. The reliability of this monitoring parameter is assured through two-party verification of the amount of electricity sold to CEMAT (the electricity regional utility company) by Usinas Itamarati S.A.. The baseline grid electricity emission factor is determined *ex-ante* and will only be updated at renewal of the crediting period.

Details of the data to be collected, the frequency of data recording, its certainty, and format and storage location are described. The recording frequency of the data is appropriate for the project.

Usinas Itamarati S.A. is responsible for the project management, monitoring and reporting as well as for organising and training of the staff in the appropriate monitoring, measurement and reporting techniques.

The monitoring plan is straightforward and no specific procedures beyond the already established QA/QC procedures will be necessary. The established procedures reflect good monitoring and reporting practices. Moreover, the plant is ISO 9001 certified since 2002.



Algorithms and formulas used have been clearly presented.

### 3.6 Calculation of GHG Emissions

Baseline emissions due to displacement of electricity, which is partly generated based on fossil fuels, are calculated by multiplying the electricity exported by the project activity to the S-SE-CO grid with an ex-ante determined baseline grid emissions factor. The project is not expected to result in project GHG emissions due to the use of a renewable energy source (bagasse) for electricity generation.

According to the chosen methodology, the only potential source of leakage could come from organizations that used to buy bagasse from the sugar mill. It was confirmed by Usinas Itamarati S.A. there was no company which used to buy bagasse from Usinas Itamarati S.A., prior to the project.

The emission reduction calculations have been presented in tabular form, the energy for internal consumption as well as the energy to be delivered to the grid, the operating hours per year and the months in which electricity is produced have been clearly documented.

The system boundary for the grid electricity system affected by the project is defined as the South-Southeast and Midwest (S-SE-CO) subsystem of the Brazilian grid. The combined margin emission coefficient for the S-SE-CO grid is determined *ex-ante* in accordance with AM0015. The calculations were based on electricity generation data provided by the Brazilian Electricity Agency (ANEEL) and the National Electricity System Operator (ONS) for the electricity generated in the South-Southeast-Midwest (S-SE-CO) grid in the years 2002-2004. Data for the years 2002-2004 are the most recent statistics available and the data was verified against the data published on the ONS website.

The ONS dataset does not include power plants that dispatch locally. However, it is justified to only include plants dispatched by ONS although they only represent about 80% of the total installed capacity. Data for the remaining plants is not publicly available as these plants 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, these plants are not likely to be affected by a CDM project and the power plants dispatched by ONS are thus representative for the operating margin.

The simple-adjusted operating margin (OM) emission coefficient is calculated to be 0.4310 tCO<sub>2</sub>e/MWh (applying an average  $\lambda$  of 0.5135) and the build margin (BM) emission coefficient is 0.1256 tCO<sub>2</sub>e/MWh, resulting in a combined margin emission coefficient of 0.2783 tCO<sub>2</sub>e/MWh (weighted average of the build and operating margin).

The build margin emission coefficient calculated for only power plants dispatched by ONS is 0.0937 tCO<sub>2</sub>e/MWh and thus more conservative than the emission coefficient of the OECD and IEA information paper (0.569 tCO<sub>2</sub>e/MWh) /6/ or the combination of IEA and ONS data (0.205 tCO<sub>2</sub>e/MWh).

It is recognised that in the absence of actual fuel consumption data, the calculated plant specific emission coefficients are sensitive to the assumed plant efficiency for each plant. Nonetheless, the applied average plant efficiencies for different power plant types established in the IEA study on the Brazilian grid /6/ are deemed to represent the best data that is currently available.



The  $\lambda$  was calculated by interpolating daily dispatch data for thermal power plants and daily dispatch data for hydropower plants based on data provided by ONS for the years 2002 to 2004. The  $\lambda$  calculations were transparently presented in spreadsheets /3/ submitted to and assessed by DNV. The selected approach for calculating  $\lambda$  is in accordance with AM0015.

### 3.7 Environmental Impacts

Usinas Itamarati S.A. has been granted an Environmental Operating License No. 537/2004 (04/08/2005) by the state environmental agency (FEMA) on behalf of the State Secretary of Environment (SEMA) and requested it to be yearly renewed (2005). The request for renewing the operation license (number 156/05 issued on 18/05/2005) included the electricity cogeneration. This confirms that the State Environment Agency is aware of the increase of the cogeneration capacity and that the environment impact assessment for this increase was also performed and approved by the State Environment Agency.

Usinas Itamarati S.A. is working with local communities on environmental education projects, reforestation of degraded areas, regular water quality assessment, support for environmental parks, hiring of local workers, erosion control, and support for community agriculture.

No adverse environmental impacts are identified, which seems reasonable given the nature of the project design. Transboundary environmental impacts are not foreseen.

### 3.8 Comments by Local Stakeholders

Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighboring communities and the office of the attorney general, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. No comments were received.

## 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

DNV published the PDD of 29 September 2005 on the DNV Climate Change web site (<http://www.dnv.com/certification/ClimateChange>) and Parties, stakeholders and NGOs were, through the UNFCCC CDM web site, invited to provide comments during the period from 04 October 2005 to 02 November 2005.

One comment was received on 01 November 2005. The comment received (in unedited form) is given in the below text box.

**Comment by:** [Yimeng Zhang, ESI](#)

**Inserted On:** 2005-11-01

**Subject:** Environmental impact assessment

**Comment:** In Section F.1. (page 43) Documentation on the analysis of the environmental impacts should be addressed. Although when built the sugar mill no EI study was conducted, FEMA did issue license in 2004 by assessing environmental impact from the power plant. The report from FEMA, or explanation and result on how did FEMA do the assessment should be described here. No official report was available doesn't mean the analysis of the environmental impacts is not needed.

***How DNV has considered the comment received in its validation:***

The 2004 Environmental Operating License only refers to the production of alcohol and sugar and does not mention the power plant. DNV requested evidence (Protocol/Process) with regard to the required license renewal at FEMAM. Moreover, DNV requested documentation on the analysis of the environmental impacts of the project activity; including transboundary impacts (refer to CL 5 in Table 3 of the validation protocol in Appendix A). The provided request for renewing the operation license (number 156/05 issued on 18/05/2005) included the electricity cogeneration. This confirms that the State Environment Agency is aware of the increase of the cogeneration capacity and that the environment impact assessment for this increase was also performed and approved by the State Environment Agency.





## 5 VALIDATION OPINION

*Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Usinas Itamarati Cogeneration Project” at Nova Olimpia Municipality, Mato Grosso state, Brazil. The validation was performed on the basis of UNFCCC criteria for CDM project activities and relevant Brazilian criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

*The project participant is Usinas Itamarati S.A. of Brazil. The host Party Brazil meets all relevant participation requirements. No participating Annex I Party is yet identified.*

*The project involves an increase of the bagasse cogeneration facility at the Usinas Itamarati S.A. sugar cane mill, allowing the mill to supply excess electricity to the grid. With the implementation of this project, the mill is able to sell excess electricity to the regional South-Southeast-Midwest (S-SE-CO) grid, avoiding thus the dispatch of the same amount of electricity partly generated by thermal power plants supplying electricity to that grid.*

*The baseline scenario is that the current practice continues, i.e. the bagasse is not utilized to generate excess electricity to be supplied to the grid and an equivalent amount of electricity would in the absence of the project activity have been generated by the operation of grid-connected power plants and by the addition of new generation sources.*

*By promoting renewable energy, the project is in line with the current sustainable development priorities of Brazil.*

*The project applies the approved baseline and monitoring methodology AM0015, i.e. “Bagasse-based cogeneration connected to an electricity grid”. The baseline methodology has been applied correctly and the assumptions made for the selected baseline scenario are sound. It is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions attributable to the project are additional to any that would occur in the absence of the project activity.*

*A combined margin emission coefficient of 0.2783 tCO<sub>2</sub>e/MWh is calculated ex-ante in accordance with AM0015, 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 2002- 2004 for the South-Southeast-Midwest grid.*

*The monitoring methodology has been applied correctly. The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators.*

*By displacing fossil fuel-based electricity with electricity generated from a renewable source, the project results in reductions of CO<sub>2</sub> 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.*

*Local stakeholder comments were invited according to the Brazilian DNA Resolution 1. No comments were received. Public stakeholder input has also been invited via the UNFCCC web-site, one comment was received and taken into account in the validation.*



*In summary, it is DNV's opinion that the "Usinas Itamarati Cogeneration Project" project, as described in the revised and resubmitted project design document of 16 November 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0015. Hence, DNV will request the registration of the "Usinas Itamarati Cogeneration Project" project as a 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 the DNA of Brazil, including confirmation that the project assists in achieving sustainable development*





## REFERENCES

*Documents provided by the project proponent that relate directly to the project:*

- /1/ Usinas Itamarati S.A. and Ecoinvest: *Project Design Document for the “Usinas Itamarati Cogeneration Project”*, Version 1 of 29 September 2005.
- /2/ Usinas Itamarati S.A. and Ecoinvest: *Project Design Document for the “Usinas Itamarati Cogeneration Project”*, Version 2 of 16 November 2005.
- /3/ Spreadsheets for the calculation of the combined margin emission Coefficient (ONS-Emission factors SSECO 2002-2004-2005.09.23.xls).

*Background documents related to the design and/or methodologies employed in the design or other reference documents:*

- /4/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /5/ Approved Baseline and Monitoring Methodology AM0015: *“Bagasse-based cogeneration connected to an electricity grid”*. Version 01 of 22 September 2004.
- /6/ Bosi, M., A. Laurence, P. Maldonado, R. Schaeffer, A. F. Simoes, H. Winkler and J.-M. Lukamba: *Road testing baselines for greenhouse gas mitigation projects in the electric power sector*. OECD and IEA information paper, October 2002.
- /7/ CDM-EB, *“Tool for the demonstration and assessment of additionality”*, Annex 1 of the report of the EB’s 16<sup>th</sup> meeting.

*Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:*

- /8/ Caetano Henrique Grossi – Environmental Manager
- /9/ Lécio Koike – Electrical Engineering - Maintenance
- /10/ Sérgio Antonio de Souza – Chemical Engineering – boilers
- /11/ Marcos Mazaferro - Ecoinvest Carbon Assessoria Ltda

- o0o -

## **APPENDIX A**

---

### **CDM VALIDATION PROTOCOL**

**Table 1 Mandatory Requirements for 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 No participating Annex I Party is yet identified.
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, CDM Modalities and Procedures §40a	--	Table 2, Section A.3 Prior to the submission of this validation report to the CDM Executive Board, DNV will have to receive 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 the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	--	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 Brazil.
5. The emission reductions shall 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
6. Reduction in GHG emissions shall 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. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
7. In case public funding from Parties included in Annex I is used for the project activity, these	Decision 17/CP.7, CDM Modalities	OK	There is no public funding involved in the project. The validation did not reveal any information that indicates that

Requirement	Reference	Conclusion	Cross Reference / Comment
Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	and Procedures Appendix B, § 2		the project can be seen as a diversion of ODA funding towards Brazil.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	The Brazilian designated national authority for the CDM is the "Comissão Interministerial de Mudança Global do Clima".
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Brazil ratified the Kyoto Protocol on 23 August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	N/A	No participating Annex I Party is yet identified.
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 Articles 5 and 7	CDM Modalities and Procedures §31b	N/A	No participating Annex I Party is yet identified.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	OK	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK	Table 2, Section F
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK	Table 2, Section B.1.1 and D.1.1

Requirement	Reference	Conclusion	Cross Reference / Comment
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	OK	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	OK	DNV Certification published the PDD of 29 September 2005 on the DNV Climate Change web site ( <a href="http://www.dnv.com/certification/ClimateChange">http://www.dnv.com/certification/ClimateChange</a> ) and Parties, stakeholders and NGOs were, through the UNFCCC CDM web site, invited to provide comments during the period from 04 October 2005 to 02 November 2005. One comment was received in this period and made publicly available.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	OK	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CER's for decreases in activity levels outside the project activity or due to force majored	CDM Modalities and Procedures §47	OK	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK	PDD is in accordance with CDM-PDD (version 02 of 1 July 2004).

**Table 2 Requirements Checklist**

Checklist Question	Ref	MoV*	Comments	Draft Concl.	Final Concl.
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	Yes The "Usinas Itamarati Cogeneration Project", is located in the municipality of Nova Olímpia, Mato Grosso State, Brazil, within the area of Usinas Itamarati S.A..		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR	Yes. The project boundary is the site where the cogeneration facilities are located (Usinas Itamarati S.A.). The system boundary for the determination of the combined margin emission factor is the South-Southeast and Midwest (S-SE-CO) subsystem of the Brazilian grid, which is the grid electricity system affected by the project.		OK
<b>A.2. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR	Yes. The project design engineering reflects good practice through the use of the steam Rankine cycle technology for steam and power generation.	GL-4	OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
			DNV requests further information about previous installed equipments and eventually discontinued equipments (boilers and generators before upgrade) as well as further information on the number and capacity of the new installed boiler(s).		
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR	Yes. The technology used is the Rankine technology adopted worldwide. The project involves expanding the cogeneration capacity of the sugar mill, which will allow for the generation of excess electricity to be supplied to the grid.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No. The project is unlikely to be replaced by other more efficient technologies, at least within the first renewable 7-year crediting period.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR	The project will require minimal additional training for project maintenance since the retrofit is only a modification of the currently used system.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The project documentation does not detail provisions for training or maintenance. This seems to be reasonable given the reasons indicated in A.2.4.		OK
<b>A.3. Contribution to Sustainable Development</b> <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	As per ANEEL Resolution No.323 (authorization to generate/sell electricity as an independent producer), total installed capacity for Usinas Itamarati S.A. is 28 MW.  DNV requests clarifications with regard to the observed difference of total installed generation capacities and installed capacity to export	GL-2 GL-5	OK OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
			<p>electricity to the grid. Moreover, DNV requests clarifications with regard to the company name that in documents like ANEEL Resolution (and Operation Licenses) appear as Usinas Itamarati S.A. instead of Usina Itamarati S.A.</p> <p>Usinas Itamarati S.A. has been granted an Environmental Operating License No. 537/2004 (04/08/2005) by the state environmental agency (FEMA) on behalf of the State Secretary of Environment (SEMA) and requested its yearly (2005).</p> <p>The 2004 Environmental Operating License only refers to the production of alcohol and sugar and does not mentions the power plant. DNV requests evidence (Protocol/Process) with regard to the required license renewal at FEMAM. Moreover, documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted.</p>		
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	<p>Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighboring communities and the office of the attorney general, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The names and details of these contacts should be presented.</p> <p>No comments were received by these stakeholders.</p>	GL4	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	Prior to the submission of the final validation report to the CDM Executive Board, DNV will		--

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



Checklist Question	Ref	MoV <sup>a</sup>	Comments	Draft Concl.	Final Concl.
			have to receive the written approval of voluntary participation from the DNA of Brazil, including a confirmation that the project assists it in achieving sustainable development.		
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project is expected to bring social (Usina Itamarati complex directly employs around 3 861 workers), environmental (conservation, mitigation, and preservation of natural resources) and economic benefits, thus contributing to the sustainable development objectives of the Brazilian Government.		OK
<b>B. Project Baseline</b> <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
<b>B.1. Baseline Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	Yes. The project applies the approved baseline methodology AM0015 - "Bagasse-based cogeneration connected to an electricity grid".		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/ /5/	DR	Yes. The project fulfils the conditions under which AM0015 is applicable. The project uses: a) only the bagasse from the same facility where the project activity is implemented, b) the project is not foreseen to be implemented by the public sector, c) the project will not increase the bagasse production and d) the bagasse to be used will not be stored for more than one year.		OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
<b>B.2. Baseline Determination</b> <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/ /3/ /5/	DR	The simple-adjusted operating margin (OM) emission coefficient is calculated to be 0.4310 tCO <sub>2</sub> e/MWh (applying an average $\lambda$ of 0.5135) and the build margin (BM) emission coefficient is 0.1256 tCO <sub>2</sub> e/MWh, resulting in a combined margin emission coefficient of 0.2783 tCO <sub>2</sub> e/MWh (weighted average of the build and operating margin). The emission coefficient calculations were transparently presented in spreadsheets submitted to and verified by DNV.		OK
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/ /3/ /6/	DR	<p>The combined margin emission coefficient for the S-SE-CO grid is determined ex-ante in accordance with AM0015. The calculations were based on electricity generation data provided by the Brazilian Electricity Agency (ANEEL) and the National Electricity System Operator (ONS) for the electricity generated in the South-Southeast-Midwest (S-SE-CO) grid in the years 2002-2004. Data for the years 2002-2004 are the most recent statistics available and the data was verified against the data published on the ONS website.</p> <p>It is recognised that in the absence of actual fuel consumption data, the calculated plant specific emission coefficients are sensitive to the assumed plant efficiency for each plant. Nonetheless, the applied average plant</p>		OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
			efficiencies for different power plant types established in the IEA study on the Brazilian grid are deemed to represent the best data that is currently available.		
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	See B.2.1		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes. All the national and/or sectoral policies implemented during the initial phase were considered. PROINFA (Programme of Incentives to the Alternative Sources of Electric Energy) was only implemented in 2004 and is only applicable to projects to be installed from January to December of 2006.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/ /3/	DR	The $\lambda$ factor was calculated by interpolating daily dispatch data for thermal power plants and daily dispatch data for hydropower plants based on data provided by ONS for the years 2002 to 2004. The $\lambda$ calculations were transparently presented in spreadsheets submitted to and assessed by DNV. The selected approach for calculating $\lambda$ is in accordance with AM0015. See B.2.2		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	See B.2.1		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/ /5/ /7/	DR	In accordance with AM0015, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality", which includes the following steps: Step 0 - Preliminary screening based on the starting date of the project activity: The starting	<del>CAR-1</del> <del>CL-3</del>	OK OK

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

Checklist Question	Ref	MoV <sup>st</sup>	Comments	Draft Concl.	Final Concl.
			<p>date of the CDM project activity, i.e. 01 September 2001, falls between 1 January 2000 and the date of the registration of the first CDM project activity (November 2004). DNV requests further clarification and evidence for the project's starting date as it is also mentioned to be August 2001 (B.3-a) and the PPA with CEMAT mentions July 2001 (A.2) as starting date.</p> <p>The document named "Critical Analysis of the Itamarati's Thermo Plant" (May 2000) is mentioned to evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. This document should be provided in order to verify its issuing date.</p> <p>Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: The possible baseline scenarios are: a) Business as usual which means producing electricity and steam for self consumption with low efficiency and b) investing in the installation of new boiler(s) and installing a new electricity generator which will allow Usinas Itamarati S.A. to supply excess electricity to the grid. Both scenarios are in compliance with all applicable legal and regulatory requirements.</p> <p>Step 2 - Investment analysis: Not applicable (Only Step 3 is selected)</p> <p>Step 3. Barrier analysis: Investment, institutional and cultural barriers (core business) are presented in the PDD:</p> <p>a) Investment barriers. The project has a negative Net Present Value with a</p>		

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

Checklist Question	Ref	MoV <sup>a</sup>	Comments	Draft Concl.	Final Concl.
			<p>discount rate of 17% and the project's IRR is 15.15%. This average project IRR is thus lower than the SELIC rate in effect at the time of financing, i.e. 17.48% in 2001. The project is thus not financially attractive under normal commercial conditions in the absence of the CDM. DNV also confirmed as an investment barrier the fact that the revenues from selling electricity represent not more than 1% of the core business revenues, i.e. the production of sugar and alcohol, thus constituting a minor part of the project developer's total income. Therefore, it is sufficiently demonstrated that the project faces an investment barrier.</p> <p>b) Institutional barriers. DNV could confirm that the regulatory environment for the electricity sector changes a lot and often in Brazil, resulting in uncertainty for renewable energy generation. The project does not qualify for PROINFA, the Brazilian Programme of Incentives for Alternative Sources of Electric Energy, because it started operation before 2006.</p> <p>c) Cultural barriers. DNV was able to confirm that the sugarcane production is different from energy production and that electricity revenues only constitute a minor part of the project developer's total income. Hence, there are cultural</p>		

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

Checklist Question	Ref	MoV <sup>a</sup>	Comments	Draft Concl.	Final Concl.
			<p>barriers for sugarcane mills to invest in increased cogeneration capacity in order to supply excess electricity to the grid.</p> <p>Step 4 - Common practice analysis: DNV was able to confirm that the efficient production of energy and heat by sugarcane mills is not common practice in Brazil. Usually the sugarcane mills produce energy inefficiently and do not supply excess electricity to the grid.</p> <p>Step 5 - Impact of CDM registration: The project participants were able to demonstrate that the sale of CERs will provide the complementary incentives for the project to alleviate the above presented barriers.</p> <p>Given the above and in particular the investment, institutional and cultural barriers the project faces, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are additional.</p>		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	Yes.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Yes.		OK
<b>C. Duration of the Project/ Crediting Period</b> <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	<p>Yes. The project start date is 01 September 2001 with an expected lifetime of 25 years.</p> <p>DNV requests further clarification and evidence for the project's starting date as it is also mentioned to be August 2001 (B.3-a) and the PPA with CEMAT mentions July 2001 (A.2) as</p>	GL-3	OK

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

Checklist Question	Ref	MoV <sup>a</sup>	Comments	Draft Concl.	Final Concl.
			starting date.		
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 7-year crediting period was selected, starting on 01 September 2001.		OK
<b>D. Monitoring Plan</b> <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
<b>D.1. Monitoring Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/ /5/	DR	Yes. The project applies the approved monitoring methodology AM0015 - "Bagasse-based cogeneration connected to an electricity grid".		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/ /5/	DR	Yes. The monitoring methodology is applicable as established in AM0015.		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/ /5/	DR	The monitoring methodology of AM0015 is correctly applied and calculation of emission reductions is based on monitoring the amount of electricity supplied to the grid. The reliability of this monitoring parameter is assured through two-party verification of the amount of electricity sold to CEMAT (the electricity regional utility company) by Usinas Itamarati S.A..		OK
D.1.4. Is the discussion and selection of the monitoring	/1/	DR	Yes.		OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
methodology transparent?					
<b>D.2. Monitoring of Project Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/ /5/	DR	Project emissions are considered zero in line with AM0015 and IPCC guidelines, which stipulate that biomass combustion is assumed to equal its re-growth, i.e. to be climate neutral.		OK
<b>D.3. Monitoring of Leakage</b> <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/ /5/	DR	According to the chosen methodology, the only potential source of leakage could come from organizations that used to buy bagasse from the sugar mill. It should be further confirmed / verified if there were any organizations, prior to the project, buying bagasse from Usinas Itamarati S.A.	GL-6	OK
<b>D.4. Monitoring of Baseline Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /3/	DR	The CO <sub>2</sub> emission factor of the grid is determined ex-ante and hence no data needs to be collected in this regard.		OK

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



Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	See D.4.1		OK
D.4.3. Will it be possible to monitor the specified baseline indicators?	/1/	DR	See D.4.1		OK
<b>D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /5/	DR	Neither AM0015 nor Resolution 1 of the Brazilian DNA requires the monitoring of social and environmental indicators.		OK
<b>D.6. Project Management Planning</b> <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR	Project management authority and responsibility are clearly described.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR	Amount of electricity sold will be obtained through invoices issued by the regional electricity company (CEMAT) and monitoring, registration and review is the responsibility of Usinas Itamarati S.A..		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	No specific procedures for training of monitoring personnel are mentioned, but the project only requires limited monitoring, which is part of normal operations. Calibration of energy meter is the responsibility of the regional electricity company. Moreover, the plant is ISO 9001 certified since 2002.		OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	See D.6.1.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	See D.6.3.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	See D.6.1.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	See D.6.1.		OK
D.6.8. 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.6.1.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	See D.6.1.		OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR	Considering the simplicity of the monitoring plan, the verification by the second party (the regional electricity company) is considered sufficient.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR	See D.6.1.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR	See D.6.1.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	See D.6.1.		OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
<b>E. Calculation of GHG Emissions by Source</b> <i>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.</i>					
<b>E.1. Predicted Project GHG Emissions</b> <i>The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/ /5/	DR	Yes. Project emissions are considered zero in line with AM0015 and IPCC guidelines, which stipulate that biomass combustion is assumed to equal its re-growth, i.e. to be climate neutral.		OK
<b>E.2. Leakage</b> <i>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.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/ /5/	DR	According to the chosen methodology, the only potential source of leakage could come from organizations that used to buy bagasse from the sugar mill. It should be further confirmed / verified if there were any organizations, prior to the project, buying bagasse from Usinas Itamarati S.A.	GL-6	OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
<b>E.3. Baseline Emissions</b> <i>The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/ /3/ /5/	DR	See B.2.1.		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/ /3/	DR	Yes. The project system's boundary is limited to the Usinas Itamarati S.A. cogeneration plant. The South-Southeast and Midwest section of the interconnected subsystem of the Brazilian grid, to which the project is connected, is the selected system boundary for determining the baseline grid emission factor		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	See E.3.1		OK
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	See E.3.2		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	See E.3.1		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	For project baseline, see E.3.1. For project emissions, see E.1.1.		OK
<b>E.4. Emission Reductions</b> 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	/1/	DR	The project is expected to reduce CO <sub>2</sub>		OK

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

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
than the baseline scenario?	/5/		emissions to the extent of 58 147 tCO <sub>2</sub> e (8 307 tCO <sub>2</sub> e / year on average) during the first renewable 7-year crediting period.		
<b>F. Environmental Impacts</b> <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Usinas Itamarati S.A. has been granted an Environmental Operating License No. 537/2004 (04/08/2005) by the state environmental agency (FEMA) on behalf of the State Secretary of Environment (SEMA) and Renew of Operation License is requested yearly (2005). The 2004 Environmental Operating License only refers to the production of alcohol and sugar and does not mentions the power plant. DNV requests evidence (Protocol/Process) with regard to the required license renewal at FEMAM. Moreover, documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted.	GL-5	OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	See F.1.1	GL-5	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	The PDD does not identify / address any environmental impacts. However, no significant adverse environmental effects are expected to be created, given the nature of the project design.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Transboundary environmental impacts are not foreseen.		OK

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

Page A-19

Checklist Question	Ref	MoV <sup>*</sup>	Comments	Draft Concl.	Final Concl.
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The project is unlikely to create any adverse environmental impacts.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	See F.1.1	CL5	OK
<b>G. Stakeholder Comments</b> <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighboring communities and the office of the attorney general, were invited to comment on the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The names and details of these contacts should be presented.  No comments were received by these stakeholders.	CL4	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	See G.1.1.	CL4	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	CL4	OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	See G.1.1.	CL4	OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	See G.1.1.	CL4	OK

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

**Table 3 Resolution of Corrective Action and Clarification Requests**

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>The document named "Critical Analysis of the Itamarati's Thermo Plant" (May 2000) is mentioned to evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. The mentioned document should be provided in order to verify its date of issuance.</p>	B.2.7	<p>See attached the final "Initial Critical Analysis" document. It is a document from 10th August 2000. This is the date the document was finalized (important to say that such study was initiated many months before).</p>	<p>The provided document, dated May 2000, mentions the possibility of CER revenues after the entering into force of Kioto Protocol.</p> <p>This CAR is therefore closed</p>
<p>CL 1</p> <p>DNV requests further information about previous installed equipments and eventually discontinued equipments (boilers and generators before upgrade) as well as further information on the number and capacity of the new installed boiler(s).</p>	A.2.1	<p>There were 3 generators and 5 boilers previous installed:</p> <p>01 generator 4MW 21kgf/cm2</p> <p>02 generator 12MW 42kgf/cm2</p> <p>03 boilers 21kgf/cm2</p> <p>02 boilers 42kgf/cm2</p> <p>New installed boiler</p> <p>01 boiler 42kgf/cm2 (150ton)</p>	<p>The provided complementary information clearly describes the previous installed equipment.</p> <p>This CL is therefore closed</p>
<p>CL 2</p> <p>DNV requests clarifications with regard to the observed difference of total installed generation capacities and installed capacity to export electricity to the grid. Moreover, DNV requests clarifications with regard to the company name that in documents like ANEEL Resolution (and Operation Licenses) appear as Usinas Itamarati S.A. instead of Usina Itamarati S.A..</p>	A.3.1	<p>There were 3 turbo generators: 2x12MW, and 1x4MW, Totalizing 28MW, as described in ANEEL 13th, August of 2001 resolution # 323. In 21<sup>ST</sup>, January of 2003 Itamarati sent a letter to ANEEL, informing them an installation of a new set of turbo generators of 18MW. In 07/03/2003, Itamarati received a reply from ANEEL, requesting only the requirements that were modified from the initial authorization (ANEEL</p>	<p>As per ANEEL Resolution No. 323/01 (dated 13/08/2001), the total installed capacity for Usinas Itamarati S.A. is 28 MW. This does correspond the total installed capacity of 38 MW mentioned in the PDD. During follow-up interview, complementary information was provided to explain the difference between the capacity stated in the PDD and ANEEL Resolution No. 323/01. It was argued that ANEEL Resolution No.232/01 refers to the old design of the project, and the ANEEL</p>

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		<p>Resolution # 323 of 13/08/2001).</p> <p>Thus in 03/04/2003, Itamarati sent a reply with the following definition: withdrawal of the generator of 4 MW, being replaced by 18MW, the system turned to have 3 generators, being: 2x12MW and 1x 18MW. The process is in progress. In 20/09/2004, ANEEL requested new information, which had been answered in 25/10/2004.</p> <p>The company name is USINAS ITAMARATI SA</p>	<p>Resolution is expected to be updated soon with regard to the actual design of the project (Usinas Itamarati S.A. replaced a generator of 4 MW capacity with a new one of 18 MW capacity. This change was communicated to ANEEL). As the permission to sell electricity was issued by ANEEL and a Power Purchase Agreement could only be signed with a valid ANEEL Resolution, it is likely that a revised ANEEL Resolution stating the correct capacity will be issued soon. However, the revised ANEEL Resolution should be checked during the first verification of emission reductions from the project.</p> <p>This CL is therefore closed.</p>
<p>CL 3</p> <p>DNV requests further clarification and evidence for the project's starting date as it is also mentioned to be August 2001 (B.3-a) and the PPA with CEMAT mentions July 2001 (A.2) as starting date.</p>	<p>B.2.7</p> <p>C.1.1</p>	<p>There is a minute of a meeting (see file attached from 11th September 2001) where Itamarati requested Rede/Cemat, the local utility, enhancements for the cogeneration system since Itamarati verified some problems in the generation/transmission system (electric losses and high consumption). These problems were identified in September, 2001.</p>	<p>The provided complementary information confirmed the starting date as mentioned in the PDD.</p> <p>This CL is therefore closed.</p>
<p>CL 4</p> <p>Local stakeholders, such as the Municipal Government, the state and municipal agencies, the Brazilian forum of NGOs, neighboring communities and the office of the attorney general, were invited to comment on</p>	<p>Table 1 - 12</p> <p>A.3.2</p> <p>G.1.1 to G.1.5</p>	<p>See attached files</p>	<p>The provide complementary information evidences that local stakeholders were invited as required by Resolution 1 of the Brazilian DNA.</p> <p>This CL is therefore closed.</p>



Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
the project, in accordance with the requirements of Resolution 1 of the Brazilian DNA. The names and details of these contacts should be presented.			
<p>CL 5</p> <p>The 2004 Environmental Operating License only refers to the production of alcohol and sugar and does not mentions the power plant. DNV requests evidence (Protocol/Process) with regard to the required license renewal at FEMAM. Moreover, documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted.</p>	<p>Table 1 - 13</p> <p>A.3.1</p> <p>F.1.1</p> <p>F.1.2</p> <p>F.1.6</p>	<p>Itamarati was set in 1980. It was not necessary to have carried out an environmental impact assessment in that time. The cogeneration project initiated in 2001, using the same industrial structure set in 1980. Some equipment was added to make possible the energy cogeneration. Therefore, it was not necessary to carry out an EIA/RIMA, since the cogeneration plant is located within the industrial area; therefore, it is already contemplated in the Environmental Operating License of the industry.</p> <p>However, there is evidence that Itamarati intent to include the thermo plant in this license. See attached file.</p>	<p>Usinas Itamarati S.A. has been granted an Environmental Operating License No. 537/2004 (04/08/2005) by the state environmental agency (FEMA) on behalf of the State Secretary of Environment (SEMA) and requested it to be yearly renewed (2005). The request for renewing the operation license (number 156/05 issued on 18/05/2005) included the electricity cogeneration. This thus confirms that the State Environment Agency is aware of the increase of the cogeneration capacity and that the environment impact evaluation was performed and approved by SEMA. This CL is therefore closed.</p>
<p>CL 6</p> <p>According to the chosen methodology, the only potential source of leakage could come from organizations that used to buy bagasse from the sugar mill. It should be further confirmed / verified if there were any organizations, prior to the project, buying bagasse from Usinas Itamarati S.A.</p>	<p>E.2.1</p> <p>D.3.1</p>	<p>There was not any company which used to buy bagasse from Itamarati.</p>	<p>According to the information provided by Usinas Itamarati, no bagasse was sold before the project implementation. This CL is therefore closed</p>