

VALIDATION REPORT for the CDM Project Activity

COPASA MG Small Thermoelectric Plant at ETE Arrudas Project

ⁱⁿ Brazil

Report No. 01 997 9105060490

Version No. 03, 2011-12-13

TÜV Rheinland (China) Ltd.

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I. Project description:

Project title:	COPASA MG Small Thermoelectric Plant at ETE Arrudas Project				
Host Country:	Brazil				
Methodology:	AMS-I.F version 2		Large Scale	\boxtimes	Small Scale
Annual average emission reductions (estimate):	3,748 tCO₂e/yr				

GHG reducing measure/technology:

Party	Project Participants	Party considered a project participant
Brazil (Host)	Companhia de Saneamento de Minas Gerais – COPASA MG	No

II. Validation:

Contract party:

Validation Team:

Role	Full name	Appointed for Sectoral Scopes	Affiliation
Team Leader Ing. Sebastián del Valle Rosales		1.2, 13.1	TÜV Rheinland do Brasil Ltda.
Technical Reviewer Mr. Praveen Nagaraje Urs		1.2, 13.1	TÜV Rheinland India Pvt. Ltd
Technical Reviewer	Dr. Lixin Li	1.1, 1.2, 3.1	TÜV Rheinland China Ltd

Validation Phases:

Desk Review

- Follow up interviews
- Resolution of outstanding issues

By:

Mr. Praveen Urs

Validation Status:

Corrective Actions / Clarifications Requested

Full Approval and Submission for Registration

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Rejected

III. Validation Report:

Report No.:		Current revision No.:	Dated	of current revision:	Date of first issue:
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Final approval:	Released		Designa	ated Operational Entity (TÜV Rheinla	DOE): Ind (China) Ltd.
	Date: 2011	-01-06 Irayoon Urs		Unit 707, AVIC Central Road, E Chaoya	C Building, No.10B East 3rd Ring Road ang District

Executive Summary – Validation Opinion

The validation team assigned by the DOE (TÜV Rheinland (China) Ltd.) concludes that the CDM Project Activity "COPASA MG Small Thermoelectric Plant at ETE Arrudas Project" in Brazil, as described in the PDD (version 07, 06/12/2011) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The selected baseline/monitoring methodology AMS I-F Version 02 is applicable to the project and is correctly applied as well as all the indicated tools in the methodology. The DOE therefore will request the registration of the project as a CDM project activity, upon closure of CAR 1 being related to the acquisition of the Letter of Approval of the Brazilian DNA.

The Validation Team has performed a validation of the project activity on the basis of UNFCCC criteria for the Clean Development Mechanism and Host Country (Brazil) criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The Validation was executed in the following steps:

- Desk review of preliminary PDD (Version 01, 11/09/2009) /1/
- First Global Stakeholder comment process (19/08/2010 17/09/2010)
- Second Global Stakeholder comment process (22/06/2011 22/07/2011)
- On-site visit with stakeholder interviews (from 21/09/2010 to 22/09/2010)
- Issue of checklist with corrective action requests (CARs) and clarification requests (CLs) and the draft validation report & protocol (19/10/2010)
- Desk review of revised PDD (Version 07, 06/12/2011) /2/
- Review of proposed correction and clarifications
- Issue of the final validation report & protocol

The host country is Brazil and no Annex I country is involved. Brazil fulfils the participation criteria and has not yet approved the project and authorized the project participants. The DNA from Brazil has not yet confirmed that the project assists in achieving sustainable development. According to the answer received from the PPs, this will only be obtained as soon as the validation report is finished.

During the stakeholder presentation of the project by the PPs, they made available the PDD (Version 01) for comments (in English and Portuguese) on website of MundusCarbo (<u>http://blog.munduscarbo.com/about/</u>) from 08/09/2009 until the present date.

The project correctly applies AMS-I.F "Renewable electricity generation for captive use and mini-grid", Version 02, which requests the use of AMS-I.D "Grid connected renewable electricity generation", Version 17, for calculations of baseline emissions.

By generating electricity with the biogas supplied from ETE Arrudas and using it captive, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

It is important to state that the project does not consist in cogeneration system, but in electricity generation without heating supply.

The total emission reductions from the project are estimated to be on the average 3,748tCO₂e per year over the selected 07 (seven) year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Moreover, adequate training and monitoring procedures will be implemented to ensure that emission reductions are real, measurable and permanent during the crediting period time.

In summary, it is the validation team's opinion that the "COPASA MG Small Thermoelectric Plant at ETE Arrudas Project" in Brazil, as described in the PDD version 07 of 06/12/2011, meets all relevant UNFCCC requirements for the CDM, meets VVM 1.2 guidelines and all relevant Host Country criteria and correctly applies the baseline and monitoring methodology AMS.I-F, version 02. The DOE thus will request the registration of the project as a CDM project activity, upon closure of CAR 1.



Abbreviations

ANEEL	National Electric Energy Agency (Agência Nacional de Energia Elétrica)
BM	Build Margin
CAR	Corrective action requests
CDM	Clean Development Mechanism
CERs	Certified emission reductions
CIMGC	Interministerial Commission for Global Climate Change
CL	Clarification
СМ	Combined Margin
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Desk Review
EB	Executive Board
EIA	Environmental Impact Assessment
ETE	Sewage Treatment Plant (Estação de Tratamento de Esgoto)
FEAM	State Foundation of Environment (<i>Fundação Estadual do Meio Ambiente</i>)
FSR	Feasibility Study Reports
GHG	Greenhouse Gas
IGAM	Water Management Institute of the Minas Gerais State (<i>Instituto</i> <i>Mineiro de Gestão das Águas</i>)
IOF	Official Press (Imprensa Oficial)
IRR	Internal Rate of Return
LoA	Letter of Approval
MoC	Modalities of Communication
MoV	Means of Verification
N/A	Not Applicable
NCV	Net Calorific Value
OM	Operating Margin
ONS	National Electric System Operator (<i>Operador Nacional do</i> <i>Sistema Elétrico</i>)
PCA	Environmental Control Plan
PCT	Small Thermal (Pequena Central Termoelétrica)
PDD	Project Design Document



PP	Project Participants
PROINFA	Program of Incentive to Alternatives Sources of Electric Energy (<i>Programa de Incentivo às Fontes Alternativas de Energia</i> <i>Elétrica</i>)
RCA	Environmental Assessment Report
RIMA	Environmental Impact Report
SCADA	Supervisory Control and Data Acquisition
SD	Sustainable Development
SSC	Small Scale
SUPRAM	Regional Superintendence of Environmental and Sustainable Development
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual
VT	Validation Team



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INTRODUCTION

The "Companhia de Saneamento de Minas Gerais – COPASA MG" has commissioned the DOE TÜV Rheinland (China) Ltd. to perform a validation of the CDM Project Activity "COPASA MG Small Thermoelectric Plant at ETE Arrudas Project" in Brazil (hereafter called "the project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. The term "UNFCCC criteria" refers to Article 12 of the Kyoto Protocol, the CDM modalities and procedures or the simplified modalities and procedures for small-scale CDM project activities (as applicable) and the subsequent decisions by the CDM Executive Board.

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 relevant criteria (see above) and decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation team has, based on the recommendations in the Validation and Verification Manual 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 have provided input for improvement of the project design.



2 METHODOLOGY

The validation consists of the following three phases:

- I a desk review of the project design documents
- II on-site visit and follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

2.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

- /1/ PDD [initially published version], Version 01, September 11th 2009.
- /2/ PDD [final version], Version 07, December 06th 2011.
- /3/ Modalities of Communication: April 13th 2011.
- /4/ CDM Validation and Verification Manual (Version 01.2)
- /5/ CDM-SSC-PDD Project Design Document form for Small-Scale project activities, Version 03
 <u>http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/index.html</u>
 GUIDELINES FOR COMPLETING THE PROJECT DESIGN DOCUMENT (CDM-PDD) AND THE PROPOSED NEW BASELINE AND MONITORING METHODOLOGIES (CDM-NM), Version 07
 - http://cdm.unfccc.int/Reference/Guidclarif/pdd/index.html
- /6/ Approved Baseline & Monitoring Methodology: AMS-I.F., Version 02
- /7/ Environmental Control Plan (PCA)
- /8/ Environmental Assessment Report (RCA)
- /9/ Basic Form of Guidance for Environmental Licensing N° 332892/2009
- /10/ Previous License and Installation License (by SUPRAM)
- /11/ Study of Technical and Economic Feasibility of Cogeneration Power in Sewage Treatment Plant Arrudas (ETE Arrudas) by Insituto Bioterra
- /12/ Description of Reunion of 19/12/2009
- /13/ User Manual Bulletin 1404 Powermonitor 3000
- /14/ User Manual Capstone C200 Microturbine
- /15/ Microturbine C200 Specifications
- /16/ Letter for Stakeholder
- /17/ Approved Baseline & Monitoring Methodology: AMS-I.D., Version 17
- /18/ Tool to calculate the emission factor for an electricity system Version 2.2.1



- /19/ Annual Plan of Energetic Operation of 2008 of the National Electric System Operator (ONS)
- /20/ Guidelines on Assessment of Debundling for SSC Project Activities (EB 54, Annex 13, Version 03)
- /21/ Technical report of Generated Gases in Activated Sludge Tanks at ETE Arrudas (Department of Health and Environmental Engineering – Federal University of Minas Gerais) – Date: June 03rd 2008
- /22/ Non-binding best practice examples to demonstrate additionality for SSC project activities (EB 35, Annex 34, Version 01)
- /23/ Website in Portuguese about Generation Capacity in Brazil: <u>http://www.aneel.gov.br/aplicacoes/capacidadebrasil/capacidadebrasil.asp</u> Date of Access: December 9th 2010
- /24/ Website CDM pipeline: <u>http://cdmpipeline.org/</u> Date of Access: December 9th 2010
- /25/ Official Journal of the Government of the State of Minas Gerais (IOF Imprensa Oficial do Estado de Minas Gerais) from 31/01/2009
- /26/ Spreadsheet with technical and economic assessment of energy cogeneration at ETE Arrudas.
- /27/ Spreadsheet with ex-ante calculation
- /28/ Letter from the Director of Research and Development of State Foundation of Environment – Date: October 22th 2010
- /29/ Letter from Capstone (Manufacturer of Microturbines) Date: August 14th 2009
- /30/ Letter to UNFCCC's Secretariat Demonstration of Prior Consideration of the CDM
- /31/ Receipt of Letter of Demonstration of Prior Consideration of the CDM
- /32/ Copasa's sustainability report, 2008. Available at: <u>http://www.copasa.com.br/relatorioanual/</u> Date of Access: December 21st 2010
- /33/ Website in Portuguese about Generation Capacity of ETE Ouro Verde Plant: <u>http://www.aneel.gov.br/aplicacoes/Empreendimento/ResumoUsina.asp?lbxUsi</u> <u>na=29968:ETE%20Ouro%20Verde</u> Date of Access: December 21st 2010
- /34/ Website in Portuguese about Generation Capacity of Energ-Biog: <u>http://www.aneel.gov.br/aplicacoes/Empreendimento/ResumoUsina.asp?lbxUsi</u> <u>na=28686:Energ-Biog</u>
 Date of Access: December 21st 2010
- /35/ Website in Portuguese about Energ-Biog Project: <u>http://cenbio.iee.usp.br/projetos/energ_biog/energ_biog.htm</u> Date of Access: December 21st 2010

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- /36/ Website in Portuguese about Decennial Plan of Electricity Expansion 2008/2017 (*Plano Decenal de Expansão de Energia*) – Ministry of Energy and Mines
 <u>http://www.epe.gov.br/PDEE/Forms/EPEEstudo.aspx</u>
 Date of Access: December 21st 2010
- /37/ Website in Portuguese about Atlas of Electric Energy in Brazil <u>http://www.aneel.gov.br/biblioteca/EdicaoLivros2009atlas.cfm</u> Date of Access: December 21st 2010
- /38/ Website in Portuguese about Program of Incentive to Alternatives Sources of Electric Energy (*Programa de Incentivo às Fontes Alternativas de Energia Elétrica – PROINFA*) <u>http://www.mme.gov.br/programas/proinfa</u> Date of Access: December 21st 2010
- /39/ Guidance on the Demonstration and Assessment of Prior Consideration of the CDM (EB 59, Annex 14, Version 02.0)
- /40/ Appendix B to the Simplified Modalities and Procedures for Small-Scale Project Activities (Version 07)
- /41/ Letter from Stakeholder: President of FEAM (Environmental Foundation of the Minas Gerais State), Mr. José Cláudio Junqueira.
- /42/ Blueprints from COPASA (General line diagram)
- /43/ Website in Portuguese about ETE Ouro Verde <u>http://www.cnrh.gov.br/sitio/index.php?option=com_docman&task=doc_downlo_ad&gid=1303&Itemid=9</u> Date of Access: April, 7th 2011.
- /44/ Website in Portuguese about about ETE Energ-Biog
 <u>http://cenbio.iee.usp.br/projetos/energ_biog/energ_biog.htm</u>
 Date of Access: April, 7th 2011.
- /45/ Law # 8.666 (21/06/1993) in Portuguese http://www.planalto.gov.br/ccivil_03/Leis/L8666cons.htm Date of Access: April, 7th 2011.
- /46/ JUNIOR, A.T.F. Analysis of Energy Utilization of Biogas Produced in Sewage Treatment Plants, 2008. UNESP (Ilha Solteira / SP) <u>http://www.dem.feis.unesp.br/nuplen/downloads/dissertacoes/Analise%20do%2</u> <u>OAproveitamento%20Energetico%20do%20Biogas%20Produzido%20numa%2</u> <u>OEstacao%20de%20Tratamento%20de%20Esgoto.pdf</u> Date of Access: April, 7th 2011.
- /47/ Historic Electricity Consuption ETE Arrudas 2010
- /48/ Interministerial Commission for Climate Change. Build and operating margin for 2010.
 <u>http://www.mct.gov.br/index.php/content/view/327118.html#ancora</u>
 Date of Access: December 6th 2011.

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 /49/ National Confederation of Industry. Energy Matrix: Scenarios, Opportunities and Challenges, 2007.
 <u>http://www.cni.org.br/portal/data/files/8A9015D015A0F71F0115AE4B9A37466</u> <u>D/Matriz%20Energ%C3%A9tica.pdf</u>
 Date of Access: December, 13th 2011.

2.2 Follow-up Interviews with Project Stakeholders

The personnel who have been interviewed and/or provided additional information to the presented documentation are identified below.

	Date	Name	Organization	Торіс
/i/	21/09/2010 to 22/09/2010	Ricardo Negri Coelho/Valeria de Seixas Ferreira/Breno Rates Azevedo	COPASA	Project Participants, Project Description, Methodology applicability, Additionality, Emission Reductions Calculations, Monitoring Plan, Environmental Impacts, Stakeholders consultation process
/ii/	21/09/2010	Junia Sibele Cunha	City council of Sabará-Secretary of Environment	Implementation of the project activity, existence of other projects in the area, and compliance with environmental laws.
/iii/	22/09/2010	Mr. Francisco Pinto Fonseca	Director of Environmental Issues State of Minas Gerais	Implementation of the project activity, existence of other projects in the area.
/iv/	22/09/2010	Mrs. Zuleika Chiacchio Torquetti	Director of Quality and Environmental Administration of the State of Minas Gerais.	Implementation of the project activity, existence of other projects in the area.

2.3 Resolution of Outstanding Issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to TÜV Rheinland's positive conclusion on the project design. In order to ensure transparency a validation protocol is customised for the project. The protocol shows in 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 the figure below. The completed validation protocol for this project is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM 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 and/or methodology specific 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.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

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

Validation Protocol Table 2: Requirement checklist					
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion	
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.	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). A request for clarification (CL) is used when the validation team has identified a need for further clarification.	

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests				
Draft report clarifications and corrective action requests	<i>Ref. to checklist question in table 2</i>	Summary of project owner response	Validation conclusion	
If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.	Reference to the checklist question number in Table 2 where the CAR or CL 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

2.4 Internal Quality Control

The final validation report underwent a technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with TÜV Rheinland's qualification scheme for CDM validation and verification.

2.5 Validation Team

Role	Full Name	Appointed for Sectoral Scopes	Affiliation
Team Leader	Ing. Sebastián del Valle	1 2 13 1	TÜV Rheinland do
	Rosales, MSc	1.2, 10.1	Brasil Ltda.
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Technical Reviewer	wir. Flaveen Nagaraje Ols	1.2, 13.1	Pvt. Ltd
Technical Reviewer	Dr Lixin Li	111231	TÜV Rheinland China
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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 revised and resubmitted project design documentation.

3.1 Approval and Participation

The below table summarizes the project participants and parties involved.

According to the local Brazilian regulations (Resolution 1 of September 2003 of the Brazilian Ministry for Science and Technology, updated by Resolution 7 of 2008), the letter of approval is emitted only when the Final Validation Report (validated by an authorized DOE) is presented to the DNA in Brasília. This is the procedure which is being followed in the present project. Hence, CAR 1 cannot be deemed closed until the registration of the project.

Project participants	Companhia de Saneamento de Minas Gerais – COPASA MG
Parties involved	Brazil
APPROVAL	
LoA received	No
Date of LoA	
Reference to document	
LoA received from	
Validation of authenticity	
Validity of LoA	
PARTICIPATION	
Party is party to Kyoto Protocol	Yes
Voluntary participation	Yes
Diversion of official development aid towards host country	No
Project contribution to SD	

3.2 **Project Design Document**

The Project Design Document is based on the currently valid PDD template and is completed in accordance with the applicable guidance document /5/.

3.3 **Project Description**

The project activity will be the implementation and operation of a small thermoelectric plant (PCT – *Pequena Central Termoelétrica*) which will generate electricity and add energetic use to biogas which is currently partially flared, since there is no control of this process. There are no legal binding in the country against methane release to atmosphere as proved through onsite assessment and desk review.

The project is located in Belo Horizonte Municipality, in Minas Gerais State (Brazil), at the Andradas Avenue, 8805 confirmed through onsite assessment. The GPS coordinate (- 19.89714° S, - 43.87909° W) was obtained through the device Google Earth, and the result is the same as stated in the PDD (V. 07) /2/.

The biogas, generated from anaerobic wastewater treatment, will be cleaned to enter the microturbines, which will produce electricity. Again, it is important to state that the project does not consist in cogeneration system, but in electricity generation without heating supply.

The electricity installed capacity of the project will be 2.4 MW, which corresponds to a small scale project according to the chosen methodology that states that only projects with generation under 15 MW are eligible. It is important to state that this energy will be consumed by ETE Arrudas' facilities and that, in the absence of the project, the energy used would be from the grid, which is mainly fossil fuel dependent.

The PCT is composed by three modules, with four microturbines each module. Since the nominal electricity installed capacity equivalent of each microturbine is 200kW, the electricity generation capacity of each module is (4*200kW) 800kW. Then, for the entire project, the electricity installed capacity is (3*800kW = 2400kW) 2.4 MW.

According to the study from State University of São Paulo /46/, 1m³ of sewage produces 0.17m³ of biogas. From COPASA, it is stated that the flow of sewage is 3.2 m³/s, which produces 0.053m³ of biogas per second. This report /46/ also presents the following equation:

$$PE = Q.NCV$$
 (eq. 1)

Where:

PE = energy potential from biogas combustion (kW) Q = biogas flow (m³/s) NCV = net calorific value (23,027.40 kJ/m³ for biogas)

Replacing the values from COPASA, the energy potential from biogas combustion obtained is 1220.45 kW, which is equal to 1.2MW.

That proofs that the project was oversized and that in any case the biogas will not unintentionally escape from the project.

The main equipments and systems that comprise this project are: gasholders, biogas treatment system, energy generation module, electricity transformation system and supervisory control and data acquisition system.

Regarding the proposed technology, the blueprint /42/ handed from the manufacturer was observed and assessed. They match the technology described by PPs during discussions on the onsite assessment and the description on section A.4.2. of PDD (V.07). Then, it can be concluded that the PPs have done an adequate description of the technology used, which will be the basis for the calculation baseline emissions. Furthermore, the description of performance of PCT be implemented is well presented and gives the reader a good idea about this technology and how emission reductions will be achieved. This technology is considered "new" since it is the first biogas-sourced electricity generation system with the microturbines in the state. The other two private enterprises that operate thermoelectric plants in Brazil make use of another technology, moto-generators.

In order to assure quality on the process, a training plan has been handed down. With this plan it is intended that the workers at the plant will be accustomed to the new procedures to

be implemented with support of an external staff for at least 01 (one) year. This plan has been reviewed by the validation team and it has been accepted as sufficient to assure a proper preparation of workers ability to coordinate a properly functioning process.

The management system and quality assurance will be controlled by management software SCADA (Supervisory Control and Data Acquisition), and all data, manuals and purchase invoices will be stored for at least 02 (two) years after the end of the project activity.

The starting date of the project has been defined as 31/01/2009, when the project was published in Official Press N° DVLI. 1020080410. Regarding tendering and contracting in Public Administration, case of COPASA, when a project is published in Official Press, the service offered has to be concluded. On the other hand, the enterprise must have to pay fines and won't be able to enter any other public tendering for the next two years. Considering these statements, the Validation Team deemed the starting date a real action, when the project actually begins, fulfilling the CDM Considerations.

The suitability of the project was validated through a desk review undertaken after the PDD version 01, which was available on the UNFCCC website for public comments. This desk review comprehended a review of the cited documents on the PDD as well as an independent investigation into the accuracy of the statements that lead the PPs to the calculated CERs of the project activity. With the results of the independent inquiries of the DOE (local sources of energy, environmental state laws, news paper cuts regarding renewable energies in the area, etc), an onsite assessment was taken into action, with a visit to the plant site, interviews with the managing authorities of COPASA's plant and with stakeholders mentioned on the PDD. A meeting with the PPs for the clarification of the inquiries that resulted from the desk review was taken place. The results from the onsite assessment resulted in the first list of CARs and CLs that was delivered to the PPs. Afterwards the PPs delivered the answered protocol of the validation report and with it a second version of the PDD with the corrections that came with it.

The PPs, changed the methodology to the latest version (AMS-I.F – V. 02), in order to apply the relevant approved methodology with respect to the project activity. This change leads to the version five of the PDD and also re-webhosting for the 2^{nd} time with the correct methodology suitable for the project activity. However, the version 07 of the PDD was submitted for registration.

After all the mentioned steps, it is the opinion of the validation team that the PPs have made on an accurate and quantitative manner the statements that lead to the reduction of emissions through the described project and will have accountable and retraceable CERs during the lifetime of the project activity.

Starting date of project	Expected project operational lifetime	Crediting period
31/01/2009	20 (twenty) years and 0 (zero) months	7 (seven) years and 0 (zero) months

The expected project operational lifetime was assessed based on expected operational lifetime of the microturbines. This information was supported by manufacturer through a letter /29/.

During the site visit, the Validation Team observed that the major equipments were already installed and were about to start running. There was also a monitoring crew at the moment of the onsite assessment who provided more details about the monitoring equipments.

Herewith, the Validation Team summarizes *major* changes between webhosted PDD and final version of PDD for submission as follows:

Subject	Webhosted PDD	Correction to webhosted PDD in the final PDD submission for registration with DOE acceptance.
Methodologies	The project was initially webhosted under AMS IC (version 17) – which didn't meet the applicability criteria. Thus the project was re-webhosted with version 05, but the version of the PDD that was submitted for registration was 07.	The DOE initially commented on the applicability conditions of the project and the project was re-webhosted using the correct methodology. Currently, it applies AMS IF (version 02) and AMS ID (version 17) for the baseline calculation. These methodologies are valid from 17/06/11 onwards.
CER calculations	The annual average of the estimated reductions over the crediting period in the first webhosted PDD was 3,674 tonnes of CO _{2e} . However, since the methodology and emission factor were properly adapted, this value has changed.	The annual average of the estimated reductions over the crediting period in version 05 of PDD, which used the correct methodology, was_1,959 tonnes of CO_{2e} . The last version of the PDD (version 07) has its crediting period changed due to update of emission factor's from 2009 to 2010. Hence, the annual average of the estimated reductions over the crediting period is 3,748 tonnes of CO_{2e} .
Additionality	Initially the additionality of the project was justified by "Technological barrier" and "Barrier due to prevailing practice", but since the current technology used is a common practice in the region and in the whole country, this barrier was removed.	In the re-webhosted version of the PDD, the additionality was explained only through the "Barrier due to prevailing practice", which is enough for validation since the project is a small scale one.
Monitoring	The parameters monitored in both methodologies are almost the	In the re-webhosted version of the PDD, the parameter "Quantity of grid

	same, but the PDD firstly webhosted is not complete.	electricity consumed by the project activity in year y" was included.
Crediting period	Initially the starting date of the first crediting period was: "01/01/2011 or the date of registration of the project activity, whichever is later". This date became unsuitable and was changed.	In the re-webhosted version of the PDD, the starting date of the first crediting period is: "01/01/2012 or the date of registration of the project activity, whichever is later." The validation team considered this date appropriate.

Please refer to Appendix A of this report for details of each change between webhosted PDD and the final PDD for submission. The Validation Team has carried out the validation process based on the Webhosted PDD and raised CARs/CLs against the project by issuing the validation protocol.

With the updated information and corrections done on final PDD, the PP has addressed all the CARs /CLs that were raised by the Validation Team.

It is concluded that the Validation Team has reviewed the project in line with the VVM (version 01.2) and all the evidence, corrections, justifications and updating done on the final PDD with respect to CARs /CLs raised are accepted and closed by the Validation Team, issuing the positive validation opinion for project registration.

3.4 Baseline and Monitoring Methodology

3.4.1 Applicability of the selected methodology to the project activity

The methodology selected by the PPs was assessed as suitable for the type of project activity during the desk review phase and onsite assessment. The used documents have been:

- Selected and applied small scale baseline methodology /6/
- Different versions of the PDD /1-5/
- Review of project documentation /13-15, 24, 27/

The PPs have in the PDD, the version 02 (two) of the approved small scale methodology AMS – I.F – Renewable electricity generation for captive use and mini-grid /6/, which is valid from 17 Jun 11 onwards

The baseline scenario is the power imported to the project from the grid (done), with the biogas fully (conservativeness) flared out without heat and electricity production.

According to paragraph 1(a) of the approved methodology (AMS-I.F, V.02) /6/, the project is applicable since it will generate renewable electricity which would be otherwise consumed from the national grid.

The project fits paragraph 2 of this methodology /6/, which states that the total installed electrical energy generation capacity of the project shall not exceed 15MW. As previously

detailed, this project activity consists in the implementation of a PCT, generating the amount of 2.4 MW of electricity for ETE Arrudas' facilities, which comprises the limits established by the methodology /6/.

As per Table 2, mentioned in paragraph 3 of AMS-IF (V. 02) /6/, it was confirmed that this methodology is applicable to the project activity since it displaces grid electricity consumption at the user end.

Paragraph 4 is not applicable to the project because it refers to hydro power plants.

Paragraph 5 states that: "For biomass power plants, no other biomass other than renewable biomass are to be used in the project activity". The term "renewable energy" refers to the biogas produced naturally by the anaerobic digestion of wastewater that comes from ETE Arrudas. Hence, this paragraph also fits the project activity.

According to paragraph 6 of AMS-IF (V.02) /6/, this methodology is applicable for project activities that install new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity. It is also applicable because before the starting date, there wasn't any construction regarding the power plant. The constructions started on 19/06/2009.

Since there was no existing renewable energy generation units before the starting date of this project activity, paragraph 7 of this methodology is not applicable.

Regarding paragraph 8, the total output of the power plant does not exceed 15MW, as explained above, hence this paragraph also meets the project,

Since the project activity will not implement both renewable and non-renewable components, paragraph 9 of the approved methodology is not applicable.

Again, it is important to emphasize that this project does not combine heat and power (cogeneration) systems. Then, paragraph 10 meets the approved methodology /6/.

The electricity and/or steam/heat produced will not be delivered to a third party, and because of that, paragraph 11 is not applicable to the project activity.

According to the Appendix B to the Simplified Modalities and Procedures for Small-Scale Project Activities (Version 07) /40/ and considering the statements above, this project fits properly type I of small-scale CDM project activities, which corresponds to Renewable Energy Projects.

The project will interrupt the use of energy from the grid due to the implementation of a PCT, which will displace the use of fossil fuels. The electricity generation will be based on biomass residue and on technologies such as microturbines will only be used by ETE Arruda's

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facilities. Considering these statements, the Validation Team deemed the methodology AMS-I.F (Version 02) applicable to the project activity.

Taking into consideration the above mentioned, it is opinion of the validation team that the selected approved methodology (AMS-I.F - Version 02 /6/) is applicable to the underlying project activity.

3.4.1.1 Debundling

By checking the registered projects in Brazil on the Riso Institute CDM Pipeline /24/ and according to EB 54, Annex 13 (paragraph 2) /20/, it was concluded that the project is not a debundled project on the basis that there is no other small scale project activity on the CDM pipeline that:

- Has the same project participants
- In the same project category and technology/measure
- Registered within the previous 2 years
- Whose project boundaries are within 1 km of the proposed project activity's boundary.

3.4.2 **Project Boundary**

According to paragraph 12 of AMS-I.F (V.02) /6/ "The spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system. In the case of electricity generated and supplied to distributed users (e.g. residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of renewable generating units. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to".

Considering that all processes in ETE Arrudas will consume the energy generated by the PCT, the boundaries should be extended to these locations, as can be seen on Fig. 4 of PDD.

The heat exchangers are not included in the project boundary, since it is not a co-generation project.

	GHGs involved	Description
Baseline emissions	CO ₂	CO ₂ emissions from the grid electricity displacement.
Project emissions	CO ₂	CO ₂ emissions from the grid electricity consumption.
Leakage	Not applicable	Zero - According to paragraphs 21 of the methodology /6/.

During the onsite assessment the plant has been visited, where at the moment the equipments are being tested.

The expected project emissions have been delivered by the PPs in form of calculations on /27/ and backed with the design of the electric equipments to be installed.

The project boundary is the area that comprehends all processes that will consume electricity from the project activity, which was identified during onsite assessment and was correctly defined by the PPs.

The geographical coordinates (-19.89714°S and -43.87909°W (19°53'49.70"S and 43°52'44.74"W)) were confirmed by Validation Team through the device Google Earth.

It is the Validation Team's opinion that the identified boundary is justified for the project activity. There are no emission sources which are excluded by the project activity and which are not addressed by the approved methodology.

Project Emission

Regarding selection of sinks and sources of greenhouse gases, the project will have a significant reduction of emission of CO_2 due to replacement of source of electricity from the grid.

Reduction of CH₄ by reduction of storage time has been discarded and is accepted as a conservative choice.

Leakage

According to the methodology /6/, since the energy generating equipment currently being utilized is not transferred from outside the boundary to the project activity, leakage is not to be considered.

Since there is no collection/processing/transportation of biomass residues outside the project boundary CO₂ emissions from collection/processing/transportation of biomass residues to the project site, then leakage should not be considered.

3.4.3 Baseline Identification

According to paragraph 14 of the methodology (AMS-I.F – V. 02) /6/, "baseline emissions [...] are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor"... Emission factor for captive electricity generation is calculated as per the procedures described in AMS-ID (V.17)

According to paragraph 11 of the methodology AMS-I.D (V. 17) /17/, "the baseline emissions are the product of electrical energy baseline $EG_{BL, y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor".

In the absence of the project activity the electricity used would be imported from the grid which is highly dependent on fossil fuel. In this case, a combined margin (CM) was calculated through the last version of "Tool to calculate the emission factor for an electricity system" (Version 2.2.1). /18/

In this tool is stated that the emission factor (combined margin) can be calculated in a transparent and conservative manner with the combination of operating margin (OM) and build margin (BM).

The equation used to calculate the emission factor (combined margin) is presented below:

$$\mathsf{EF}_{\mathsf{grid},\mathsf{CM},\mathsf{y}} = \mathsf{EF}_{\mathsf{grid},\mathsf{OM},\mathsf{y}} \cdot \mathsf{w}_{\mathsf{OM}} + \mathsf{EF}_{\mathsf{grid},\mathsf{BM},\mathsf{y}} \cdot \mathsf{w}_{\mathsf{BM}} \text{ (eq. 2)}$$

Where:

 $EF_{grid,CM,y}$ = Combined margin CO₂ emission factor in year y (tCO₂/MWh); $EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (tCO₂/MWh); w_{OM} = Weighting of operating margin emissions factor (50%); $EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (tCO₂/MWh); W_{BM} = Weighting of build margin emissions factor (50%).

The Brazilian DNA - Inter-Ministerial Commission for Climate Change presents values of operating margin per hour, per day and per month - deeming electricity production constant. A weighted average of this values was made for calculation of $\text{EF}_{\text{grid},\text{OM},y}$ and for subsequent valuation of $\text{EF}_{\text{grid},\text{CM},y}$. The calculations were made considering data from 2010 /48/.

It is important to state that the $EF_{grid,CM,y}$ and $EF_{grid,OM,y}$ are available every year, and the calculations for this year (2011) are not available yet, since the year has not finished.

It is known that this parameter will be monitored ex-post, but for estimation of ex-ante values it has been assumed by the PPs that these parameters would remain constant during the crediting period as a simplification. The data was collected from the Interministerial Comission on Global Climate Change of 2010. /48/

The high demand promoted by economic growth leads to a constant and increasing dependence on non-renewable thermal sources, i.e., the rate of installation of renewable sources is not yet compatible with the growth rate of national energy demand. According to the National Confederation of Industry, the world demand of coal, natural gas and oil will be increased to more than 110 quadrillion BTU in 2030. /49/

Thus, it is estimated that the national electricity system has its emission factor (ratio tCO2 issued for each MWh produced) increased over the next 10 years. The data recently published by CIMGC (Interministerial Commission on Global Climate Change) /48/ reinforce this recent change in national energy scenario. The Operating Margin (OM) for the year 2010



shows an increase of 93% over 2009, from 0,25 to 0,48, approximately. These data are conservative since they are calculated by a government agency. /48/

The calculation was demonstrated through spreadsheet /27/. The results have been reviewed and are considered to have been generated on a proper manner.

 The approved baseline methodology applicable to the project explicit criteria implicit criteria (e.g. available scenarios, applicability of formulas for BE/PE/LE calculations) 	⊠ Yes □ No	AMS – I.F (version 02) /6/ is applicable to the project activity. See discussion on section 3.4.1.
PDD includes all assumptions and data used by project participants	Yes	All assumptions and data quoted on the PDD are available.
All the references and documents used are relevant for establishing the baseline scenario	⊠ Yes □ No	Approved Methodology /6/ Tool to calculate the emission factor for an electricity system – V. 2.2.1 /18/ Annual Plan of Energetic Operation of 2008 of the National Electric System Operator (ONS) – Page. 21 /19/ Spreadsheet with ex-ante calculations /27/ By review of their contents the validation team confirmed that the used references are relevant and appropriate.
All the references and documents used are correctly quoted and conservatively interpreted in the PDD	⊠ Yes □ No	Reference documents have been assessed /14, 23, 32 – 38/.
All relevant policies / regulations considered are listed in the PDD	⊠ Yes □ No	As per interview with the Director of Environmental Issues State of Minas Gerais it was assessed that the PPs have fulfilled all legal needs to go ahead with the project activity.
Identified potential baseline scenarios reasonably represent what would/could occur in the absence of the proposed project activity	Yes	In the baseline scenario, electricity would be consumed from the grid.
The baseline scenario selection is appropriate and determined according to the methodology	⊠ Yes □ No	Yes, according to AMS – I.F (version 02) /6/, the baseline scenario would be the production of electricity in a biomass fired unit (without a possibility of export of electricity either to the grid or to other facilities).
The approved methodology used is applicable to the identified baseline scenario	Yes	Yes, see discussion on section 3.4.1.

3.4.4 GHG Emission Reductions

The validation team took the following steps to assess the calculations of GHG Emission Reductions:

1. Review of the PDD and the spreadsheets provided by project participants /1-2, 26-27/

2. Review of the reference information sources /1-2, 6/

As a result of the above mentioned reviews, it was possible to observe that all calculations made for estimating GHG and data used by the project participants are listed in PDD, including their references and sources. These references and documents were correctly quoted and conservatively interpreted in the PDD, as well as the methodology applied. Hence, it was deemed that all the emissions, baseline emissions, leakage emissions and emission reductions can be replicated using information provided in the PDD, leaving no uncertainties.

The quantity of grid electricity consumed by the project activity in year y $(EC_{PJ,y})$ is considered zero for ex-ante calculation, but will be continuously monitored ex-post.

All assumptions made for estimating GHG are listed in the PDD	Yes	All calculations and data provided in section B.4 and B.6.1 of the PDD /2/.
All data used by project participants are listed in the PDD	Yes	B.6.1, B.6.2 and B.7.1 contain all data used in the calculations.
Their references and sources are also listed in the PDD	Yes	Values of emission factors are calculated by Inter-ministerial Commission for Global Climate Change.
Formulas, parameters, values are complete, accurate, transparent and conservative	Yes	All parameters have been evaluated and are considered as valid. The PPs listed correctly the emission reductions formulas. Regarding parameters and values, see discussion in section 3.6.1
All the references and documents used are correctly quoted and conservatively interpreted in the PDD	Yes	The Validation Team cross-checked the information contained in these documents with the values used in the PDD for calculation purposes and confirmed that they have been applied correctly in the calculations.
Methodology has been applied correctly to calculate project emissions, baseline emissions, leakage emissions and emission reductions	Yes	Bearing in mind the above mentioned, the validation team concludes that this is the case.
All the emissions of baseline emissions can be replicated using information provided in the PDD	Yes	Bearing in mind the above mentioned, the validation team concludes that this is the case.

The calculations provided by project participants were considered complete, accurate, transparent and conservative by the validation team as per review of the calculation spreadsheets /27/.

3.5 Additionality

The additionality of the project activity has been evaluated by the application of "Non-binding best practice examples to demonstrate additionality for SSC project activities" (EB 35 Report Annex 34) from the UNFCCC as prevailing practice barrier analysis.

The analysis due to prevailing practice barriers is deeming the existing practices or existing regulatory or policy requirements that would have lead to the implementation with higher emissions.

The current situation is the combustion of biogas produced by the digestion of wastewater. The implementation of the project activity will add energetic value to this biogas, generating electricity to be consumed by ETE Arrudas, reducing emission of GHG.

There are two other biogas-sourced electricity generation systems in Municipal Wastewater Treatment facilities in Brazil, ETE Ouro Verde and Energ-Biog, which have 20kW and 30kW, respectively, of capacity of electricity generation. The VT made a research and found that both projects use moto-generators to generate electricity /42-43/. This technology is very different from the microturbines applied in the project.

The validation team reviewed the information contained in the UNFCCC website and on the Riso Institute CDM Pipeline /24/ and confirmed that there are no similar registered CDM project activities in the same region. ETE Ouro Verde is located in Foz do Iguaçu, in Paraná State, and Energ-Biog plant is in Barueri (São Paulo State), which is 1.650 km and 614 km distant, respectively, from COPASA's plant.

Therefore, the VT deemed that no other CDM project uses the same technology in the region, this makes for the fact that the project will be considered as a first of its kind, within the CDM market in the region. Furthermore, during onsite assessment with the stakeholder meetings and later through own bibliographical research on local papers, it was assessed that there is no use of this type of technology on any place of the region where it is established.

The director of research and development of State Foundation of Environment of State Foundation of Environment (FEAM – Fundação Estadual do Meio Ambiente) has stated in a letter /28/ from October 22nd 2010 (free translation made by VT): "I declare, for appropriate action, that the Small Thermal Power Plant of 2.4 MW, installed at Arrudas' Sewage Treatment Plant, which is COPASA MG's property, using the microturbine technology supplied from biogas captured in the treatment of domestic sewage, is the first facility of its kind in the state of Minas Gerais, according to Integrated System of Environmental Information (SIAM – Sistema Integrado de Informações Ambientais) of State Secretary of Environment and Sustainable Development".

Considering the statements above and since the project is deemed the first of its kind by the director of research and development of the State Foundation of Environment /28/ in terms of technology and geography, this project activity is considered additional as a small scale CDM project activity.

3.5.1 CDM consideration

The starting date of the project has been defined as 31/01/2009, which corresponds to the date of publication of the project in Official Press (IOF) /25/. For Public Administration Companies in Brazil, there is a Law (N° 8.666 of June 21^{st} 1993) /45/ which states that "construction works (and) services (...) of the Public Administration, when commissioned to third parties, are necessarily preceded by tender (...)" (2^{nd} article) and "The publication of the summary of the instrument of contract (...) in the official press, which is indispensable condition for its efficacy, shall be arranged by the Administration (...)" (61^{st} article).

After the publication, the services have to be concluded by the enterprise that has won the tendering. The services included in this publication are: execution, with total supply of materials, services and equipments, works and services of implementation of systems to combat odour in preliminary treatment, electricity generation, use of thermal energy to heat the sludge and ultra-sonification of the thickened sludge biological, consulting engineering, assisted operation and maintenance, in ETE Arrudas, in Belo Horizonte municipal. The CDM project is included in 'electricity generation'.

The enterprise that not fulfill their services have to pay a fine and looses the capability to enter any other public tendering for the next two years. This is injurious to any enterprise, which leads to the conclusion that all services might be concluded. For the VT, these justifications are enough to state that it is considered a real action for the beggining of the project activity.

The project starting date is therefore after 02nd August 2008. The PDD (Version 01) was published for global stakeholder consultation on 14/10/2009, which is after the expected starting date, thus, according to "Guidance on the Demonstration and Assessment of Prior Consideration of the CDM" (EB 59, Annex 14) /39/ a notification to the DNA and UNFCCC is necessary.

A letter signed by the Environmental and New Business Prospecting Director was sent to UNFCCC's Secretariat in 13/05/2009 /30/, and the receipt of notification was received in 24/05/2009 /31/.

According to the CDM Glossary of Terms Ver. 5, "The starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins" Taking the project within this context, the earliest date at which the PPs have committed to expenditures and further construction of the project, is the one already shown on the PDD. 19/06/2009 was the date on which the project started its

construction. Therefore the validation team concludes that the chosen starting date 31/01/2009 is the one that will fulfill the CDM requirements.

Starting date of project	Justification of and evidences (references) on the starting date of project	Date of CDM consideration
31/01/2009	This date corresponds to the date of publication in Official Press, which means, for public administration companies (case of COPASA), that the enterprise that has won the tendering has the obligation to comply with the proposal offered. In the case, the CDM project Validation.	The earliest date at which a real action of a project activity begins.

3.5.2 Alternatives

N/A as the methodology does not call for this.

With the personal interest, the validation team did assessment of alternative to the project activity during the site visit and with the local expert and found that it would be the continuation with the current situation (business-as-usual), the use of electricity from the grid. Thus the chosen baseline is realistic and during the onsite assessment it was proven as a plausible alternative, since it faces no barriers at all.

The baseline (current situation) complies with the applicable and enforced legislation in Brazil.

It is the validation team's opinion that the chosen baseline is complete and realistic since in the region there are no incentives for renewable energy projects.

3.5.3 Barrier analysis

Since the project activity is a small scale, one barrier analysis is enough to demonstrate that this project would not have occurred anyway. In case of COPASA's PCT the barrier chosen is "Barrier due to prevailing practice" since it is the first biogas-sourced electricity generation system with the microturbines in the state with 2.4 installation capacity.

According to the National Electric Energy Agency (ANEEL – Agência Nacional de Energia *Elétrica*) /23/ there are only two private enterprises operating thermoelectric plants in Brazil, one in Paraná and the other in São Paulo State, and their capacity are 20 kW and 30 kW, respectively. These plants are located very distant from COPASA (1650 and 614 km, respectively). They use moto-generators, which is a different technology from that used at COPASA.. Researches were made in Riso Institut and UNFCCC website, but no project with



same technology was found. It confirms that the project is the first biogas-sourced electricity generation system in Brazil.

The barrier due to prevailing practice is significant since the current practice is the common practice in the region, and the project activity is considered "the first of its kind". This statement can be proved through letter from the Director of Research and Development of State Foundation of Environment (FEAM – *Fundação Estadual do Meio Ambiente*) /28/, who made a statement confirming that COPASA is the first facility of its kind in the state of Minas Gerais, according to Integrated System of Environmental Information of State Secretary of Environment and Sustainable Development. Hence, the VT considered these factors and this letter as evidences to prove the lack of practice of this technology in the region.

In summary, there are not any plants like COPASA's near the region, and in the whole country, because the other two that exist, use different technology. Again, this is the first biogas-sourced electricity generation system in Brazil, which is a strong indication of lack of practice. In addition, a letter from the Director of Research and Development of State Foundation of Environment was provided as evidence. These factors, together with interviews, were considered proves of the lack of practice of this technology implemented in COPASA.

The Validation Team evaluated the credibility of barrier analysis by the application of "Nonbinding best practice examples to demonstrate additionality for SSC project activities" (EB 35, Annex 34) /22/ and since this project is considered the "first of its kind", as per paragraphs above, this barrier was deemed as appropriate to the project activity.

3.5.4 Common practice analysis

N/A as since the project is small scale and does not require demonstrating the common practice analysis.

However the validation team conducted its assessment on the project activity. The project activity is not considered a common practice since there are not similar projects in the region, therefore deemed "the first of its kind". This statement can be proved through letter from the Director of Research and Development of State Foundation of Environment (FEAM – *Fundação Estadual do Meio Ambiente*) /28/. The geographical scope of the common practice analysis has also been validated through stakeholder's consultation.

At ANEEL's list /23/ (ANEEL – National Electric Energy Agency) there are only two similar projects in Brazil, one in Paraná State and the other in São Paulo State, and their capacity are 20 kW and 30 kW, respectively. Since total generation capacity of COPASA's project will be 2.4 MW (800 kW each module), and considering comments above, the Validation team does not consider the proposed CDM project activity as a common practice and deems it is the "first of its kind", in terms of technology, geography and sector.

3.6 Monitoring

Monitoring plan has been presented and it is in compliance with the requirements of the selected methodology AMS-I.F (V. 02). /06/

The monitoring plan was validated by review of the PDD /02/ and supporting documentation /13-15, 26/.

As a result of the above mentioned reviews, it was concluded that the project participants are able to implement the monitoring plan in the context of the project activity.

3.6.1 Parameters determined ex-ante

Parameters necessary to calculate emissions from the proposed project activity are:

Parameter	Value / Unit Applied	Validation means / Conclusion
Quantity of net electricity produced as a result of the CDM project activity in year "y"	MWh	Electricity generation estimation obtained from the study elaborated by <i>Instituto Bioterra.</i> /11/
Emission factor in year "y"	0,3095 tCO _{2e} /MWh	Since this value is calculated from the Interministerial Commission on Global Climate Change of 2010 and since it will be monitored ex-post, this parameter is deemed conservative and correct.
Baseline emission in the year "y"	tCO _{2e}	Since this value is the product of 'Quantity of net electricity produced as a result of the CDM project activity in year "y" and 'Emission factor in year "y", if these values are deemed correct, also is the baseline emission.
NCV _{biomass} - Heating value of the biomass been used on microturbines	24798 kJ/m ³ (± 513 kJ/m ³)	Data has been checked on the desk review, considered as accurate and conservative. /21/

3.6.2 Parameters monitored ex-post

The parameters that will be monitored ex-post and their details are in the table below:

Parameter	Unit	Description	Source of Data	QA/QC Procedures
EG _{PJ,h}	MWh	Electricity generation by the project activity in hour "h" of year "y"	Project Participants	The equipments will be calibrated as per manual of user. /13 – 14/
EG _{BL,y} and EG _{PJ,y}	MWh	Renewable electricity production by the project activity in the year "y" and Total electricity displaced by the project activity in year "y", respectively. It is important to state that $EG_{BL,y} = EG_{PJ,y.}$ These values were obtained from the study elaborated by Instituto Bioterra (<i>Estudo de</i> <i>viabilidade técnica</i> <i>econômica de cogeração</i> <i>de energia na estação de</i> <i>tratamento de esgoto do</i> <i>Arrudas /11/</i>).	Project Participants	This parameter will be crosschecked with the electricity purchase records and the equipments will be calibrated as per manual of user.
EF _{EL,DD,h}	tCO ₂ / MWh	CO ₂ emission factor for power units in the top of the dispatch order in hour "h" in year "y"	Inter- Ministerial Commission on Global Climate Change	As per the most recent version of the "Tool to calculate the emission factor for an electricity system". /18/
EF _{grid,BM,y}	tCO ₂ / MWh	Build margin CO ₂ emission factor in year "y"	Inter- Ministerial Commission on Global Climate Change	As per the most recent version of the "Tool to calculate the emission factor for an electricity system". /18/
EC _{PJ,y}	MWh	Quantity of electricity consumed by the project activity in year "y"	Project Participants	This parameter will be crosschecked with the electricity purchase records and the equipments will be calibrated as per manual of user $(13 - 14)$



EF _{grid, CM, y}	tCO ₂ / MWh	Combined margin CO ₂ emission factor in year y	Project Participants	This parameter will be crosschecked with the build and operating margin CO_2 emission factor as per equation 2 of PDD.
-	Nm³	Quantity of biomass (biogas) consumed in year y	Project Participants	This value will be measured continuously To be measured continuously or estimated using annual mass/energy balance.

All reviewed parameters are complete and consistent with the requirements from the approved methodology for the project activity in order to ensure dependable data for the verification of the emissions reductions at the end of the crediting period.

It is considered by the validation team that the section B.7.1 of the PDD shows a list of parameters which will be monitored in an accurate manner. The monitoring plan fulfils the requirements of the methodology. Besides, the QA/QC procedures necessary to ensure robust and conservative monitoring of all monitoring parameters are considered appropriate, since they follow the manufacturer's procedures.

It is important to state that the PPs chose to use the emission factor as an ex-post parameter since here in Brazil it will be published by a reliable organization, which is the Interministerial Commission on Global Climate Change.

3.6.3 Management system and quality assurance

The frequency, responsibility and authority for registration, monitoring, measurement and reporting activities are described in sections B.7.2 4 of the PDD.

The management system and quality assurance will be controlled by management software SCADA (Supervisory Control and Data Acquisition), which will execute:

- Data Collection;
- Data Storage;
- Local Control;
- Remote Control or Operations;
- Signalize irregular situations;
- Display Historical Process' Data;
- Display Real Process' Data.

The following information/documents will be kept in electronic and paper media for at least 02 (two) years after the end of the crediting period:

- Electricity Purchase Invoice;
- Maintenance and Calibration Manuals of Equipments;
- Monitored Data.

The quality of data will be assured by:

- The implementation of Operations and Maintenance Plan (which will be available for inspection during project Verification);
- Contract of an external staff to operate the PCT for at least 01 (one) year: During this period, local employees will purchase know-how and experience to maintain properly work after this year.
- Trained workers to operate the equipments;

3.7 Sustainable Development

At the time of finishing this report due to already explained reasons there is no letter of approval at sight.

3.8 Environmental Impacts

The environmental impacts can be reduced by the improvement of energy efficiency, which leads to a reduction of GHG emissions. Currently, the biogas produced is flared out, because methane is a more harmful gas than carbon dioxide. In this project activity, methane will be used to generate thermal energy, reducing the use of electric energy from the grid, diminishing atmospheric effluents and reducing risks of explosion. Besides, the PCT requires a pretreatment to clean the biogas before entering the combustion chamber and a better combustion control. The consequences will be atmospheric effluents with less pollution comparing with current situation and less sub-products from incomplete combustion.

In section D.1, PDD includes a comprehensive description of the project activities environmental impacts and regulations toward this. COPASA obtained preliminary and installation license /10/ on April, 5th 2010, allowing PPs to implement the project activity. This authorization was obtained through the presentation of a PCA (Environmental Control Plan) /8/ and the respective RCA (Environmental Assessment Report) /9/.

An Environmental Impact Assessment (EIA) and a correspondent Environmental Impact Report (RIMA) were not needed, since they are requirements for large scale projects.

3.9 Local Stakeholder Consultation

The local stakeholders consulted and made public the project activity are as follow:

- Mayor of Sabará Municipality;
- Sabará's Municipal Secretary of Environment;
- President of Sabará's Municipal Legislative Chamber;
- Brazilian Forum of NGOs and Social Movements for the Environment;

- Environmental Secretariat of the Minas Gerais State (Secretaria Estadual de Meio Ambiente);
- Environmental Foundation of the Minas Gerais State (*Fundação Estadual do Meio Ambiente* FEAM);
- Water Management Institute of the Minas Gerais State (*Instituto Mineiro de Gestão das Águas* IGAM);
- State Environmental Prosecutor;
- Federal Environmental Prosecutor;
- Manuelzão Project (Projeto Manuelzão);
- Community Association 'January 5th' of the Housing State Mariano de Abreu (*Associação Comunitária e Habitacional 5 de Janeiro do Conjunto Mariano de Abreu*);
- 'Esperança' Communitarian Association (Associação Comunitária Esperança);
- 'Baluarte da Verdade' Communitarian Association (Associação Comunitária Baluarte da Verdade)

The stakeholder consultation was made through letter of invitations /16/. They were sent to each of them on 08/09/2009, inviting them to openly comment on the project with instructions to download the PDD.

The receiving invitations were checked by the Validation Team through receiving notes typically used in post offices in Brazil.

The validation team went through two stakeholder's meetings. The dates, venues and the stakeholders consulted are described bellow:

Date: 21/09/2010 Stakeholder's Name: Júnia Sibele da Cunha Santos Local: Sabará's Municipal Secretary of Environment (*Secretaria Municipal de Meio Ambiente de Sabará*) Address: Prefeito Serafim M Barros Street, 109 - 24505-404 - Sabará, MG. Brazil

Date: 22/09/10 Stakeholder's Name: Paulo Eduardo Fernandes de Almeida Local: Fundação Estadual de Meio Ambiente - FEAM Address: Prefeito Américo Gianetti Highway, unnumbered - Serra Verde, Minas Building. 1st Floor - 31630-900 - Belo Horizonte, MG. Brazil

Comments were received by the President of FEAM (Environmental Foundation of the Minas Gerais State), Mr. José Cláudio Junqueira, as can be seen in document /41/. The comment only made mention of that the project had already fulfilled all of the environmental legislation requirements.

3.10 Comments by Parties, Stakeholders and NGOs

The PDD *version 01* of 11/09/2009 was made publicly available on the UNFCCC web page (Project ID:

<u>http://cdm.unfccc.int/Projects/Validation/DB/TGXTA5HZOD84WYF4Y1VTWYPXV5IKYA/view</u> <u>.html</u>) from "19/08/2010" to "17/09/2010" in order to invite comments from public stakeholders.

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The second webhosting of the PDD (version 05) was made from "22/06/2011" to "21/07/2011" in the following UNFCCC web page:

http://cdm.unfccc.int/Projects/Validation/DB/FLBMTPINYW2PBN079UUJ3SIY2MHT83/view.h tml

The comments received during the second webhosting are given in the bellow text box.

Comment by:

Accredited NCO Rarty Stakeholder
Provided on: 14/07/2011
Subject:
Comment:
1) "DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant."
VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.
2) DOE must not entertain this project any more if found the DPR/FR is tamprered with at any point in time. PP can not give different DPR's and FR's. They must submit only the one given to Banks and other agencies while obtaining loans and decision making time.
VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.
3) DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project.


VT response: DOE has checked all PDD values, and considered them all to be conservative.

4) DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also.

VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.

5) Careful study must be done so that the DPR/FR is not in different versions made and submitted with different purposes to different agencies, which is totally unacceptable, illegal and unethical.

VT response: The project has not a DPR/FR.

6) Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE.

VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.

7) DPR/FR values must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts.

VT response: The project has not a DPR/FR.

8) Has the PP considered the CDM revenues while envisaging the project? Without CDM the project was not viable, is it right? This project is having a debt component? Then how bankers or lenders gave the loan? Have the bankers or lenders considered the CDM revenues while agreeing to give loan to this projects? If not this project should be rejected right away by DOE by terminating the contract forthwith. If yes, where is the proof? What is



the date of the evidence document from bank? Is this document printed now a days or earlier. DOE to independently check the same. If the document is available from Bank it must be checked from all angles so that it is genuine and not forged and date changed by putting back dated. This is normally done, DOE to be aware of this please. Please check the communication the PP had during that time with banks, emails and postal receipts and the weights and dates mentioned on the receipts. Do not believe in courier bills and receipts since these can be cooked up easily. Insist on government owned postal service receipts only. If the project is fully equity project then on what basis the PP has invested full equity in to the project while considering the CDM revenue? DOE to check the same in detail and bring out the facts. Is there any past record of this PP to invest or not to invest at returns what he is talking about in this project? Proper evidences must be reviewed and digged out by the DOE and take decision on the project based on established facts. Do not ask documents from PP, DOE to collect the same from different sources to do independent evaluation.

VT response: The project will not receive any bank or other agency's money.

9) How is the base line defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the base line as suggested by the PDD. Please check that there are real emission reductions beyond the real and factual base line. It may so happen that this project qualifies for no CER's. DOE cannot assume values and things as giving by this PP. Whatever values are considered throughout the project in all documents including the real DPR (not the one prepared for CDM, the one given to the banks and others), they must be validated, verified and double checked. Do not ask PP for DPR. Ask the parties who have been given DPR by the PP. Get directly from the bank and others by each page of the DPR and Feasibility report signed. Such document can be considered as a real DPR or FR. UNFCCC CDM process cannot be degraded by fabricating and misinterpreting the project base line and additionality.

VT response: The baseline was crosschecked through onsite assessment and is fully in accordance with the last version of the PDD.

10) From DOE side which auditor has done marketing and business development for acquiring this business of validating this project? With whom he or she was co-ordinating at PP or CER buyer? The same person who has done the marketing and business development to acquire the business do validation or participate in any manner what so ever in the validation process? One cannot do like that. It is against the accreditation rules and norms followed since ages. DOE should send auditors from different offices or countries to do this validation audit. DOE must take care of impartiality and accreditation rules. Due to the targets set by the DOE managements auditors are doing marketing and meeting clients and giving promises that the project will be taken care. Is it acceptable and fair? This must be stopped. No auditor should do marketing. Only non-auditing staff should do marketing. DOE to ensure the same please.

VT response: Not applicable to the project activity.



11) If applicable only: Is these machines, equipment was a part of any bundle of CDM activity envisaged and developed earlier. DOE to check the same through independent sources also. Once some bundles are non-additional and getting negative validation from a DOE, PP is rolling out the same project as an individual project which is not a CDM project at all. DOE to verify the same from independent sources and also take undertaking in the form of an affidavit from the PP's that any misrepresentation or false statement with respect this would attract strict legal action from UNFCCC and DOE. Furthermore the registered project must be de-registered in case of any future findings contradicting the submissions made by the project owner.

VT response: Not applicable. As per item 5.2.1.1 from Table 1 the project is NOT a bundle of any CDM project.

12) DOE to be more careful so that this is a genuine CDM project. What is the exact project cost? The project cost is covering what? Each value considered must be validated with proof. The machinery is second hand purchased or fresh and new from an OEM? In either case DOE to check all the quotations, proposals, purchase orders, invoices, way bills, transport bills, proof of payments like bank statements. DOE to check with banks by way of written confirmation the amount transacted, to whom the money is paid, when the money is paid, is the party paid is the correct party as shown in the purchase orders. It may so happen that the values, party names, dates are fabricated and misrepresented in this project. DOE should terminate their contract for this project immediately. This is the only way out to protect the value of CDM process. If the PP is purchasing second hand or second quality equipment and inflating the purchase order values and invoices, this must be probed thoroughly and real values to taken for additionality calculation. Then I'm sure the additionality is not there at all in such a situation.

VT response: Not applicable to the project activity.

13) Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst.

VT response: The equipments purchased are not second hand, but the additionality of the project was proved through barrier due to prevailing practice.



Comment by: Accredited NGO Party Stakeholder Provided on: 27/06/2010 Subject: Comment:								
1) DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project.								
VT response: DOE has checked all PDD values, and considered them all to be conservative.								
2) DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also.								
VT response: The project has not a DPR/FR.								
3) Careful study must be done so that the DPR/FR is not in different versions made and submitted with different purposes to different agencies, which is totally unacceptable, illegal and unethical.								
VT response: The project has not a DPR/FR.								
4) Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE.								
VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.								
5) DPR/FR values must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts.								
VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.								
6) DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by								

PP/Consultant.



VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.

7) DOE must not entertain this project any more if found the DPR/FR is tamprered with at any point in time. PP can not give different DPR's and FR's. They must submit only the one given to Banks and other agencies while obtaining loans and decision making time.

VT response: The project has not a DPR/FR. The project will not receive any bank or other agency's money.

Has the PP considered the CDM revenues while envisaging the project? Without 8) CDM the project was not viable, is it right? This project is having a debt component? Then how bankers or lenders gave the loan? Have the bankers or lenders considered the CDM revenues while agreeing to give loan to this projects? If not this project should be rejected right away by DOE by terminating the contract forthwith. If yes, where is the proof? What is the date of the evidence document from bank? Is this document printed now a days or earlier. DOE to independently check the same. If the document is available from Bank it must be checked from all angles so that it is genuine and not forged and date changed by putting back dated. This is normally done, DOE to be aware of this please. Please check the communication the PP had during that time with banks, emails and postal receipts and the weights and dates mentioned on the receipts. Do not believe in courier bills and receipts since these can be cooked up easily. Insist on government owned postal service receipts only. If the project is fully equity project then on what basis the PP has invested full equity in to the project while considering the CDM revenue? DOE to check the same in detail and bring out the facts. Is there any past record of this PP to invest or not to invest at returns what he is talking about in this project? Proper evidences must be reviewed and digged out by the DOE and take decision on the project based on established facts. Do not ask documents from PP. DOE to collect the same from different sources to do independent evaluation.

VT response: The project will not receive any bank or other agency's money.

9) Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst.

VT response: The equipments purchased are not second hand, but the additionality of the project was proved through barrier due to prevailing practice.

10) From DOE side which auditor has done marketing and business development for acquiring this business of validating this project? With whom he or she was co-ordinating at PP or CER buyer? The same person who has done the marketing and business development to acquire the business do validation or participate in any manner what so ever



in the validation process? One cannot do like that. It is against the accreditation rules and norms followed since ages. DOE should send auditors from different offices or countries to do this validation audit. DOE must take care of impartiality and accreditation rules. Due to the targets set by the DOE managements auditors are doing marketing and meeting clients and giving promises that the project will be taken care. Is it acceptable and fair? This must be stopped. No auditor should do marketing. Only non-auditing staff should do marketing. DOE to ensure the same please.

VT response: Not applicable to the project activity.

11) If applicable only: Is these machines, equipment was a part of any bundle of CDM activity envisaged and developed earlier. DOE to check the same through independent sources also. Once some bundles are non-additional and getting negative validation from a DOE, PP is rolling out the same project as an individual project which is not a CDM project at all. DOE to verify the same from independent sources and also take undertaking in the form of an affidavit from the PP's that any misrepresentation or false statement with respect this would attract strict legal action from UNFCCC and DOE. Furthermore the registered project must be de-registered in case of any future findings contradicting the submissions made by the project owner.

VT response: Not applicable. As per item 5.2.1.1 from Table 1 the project is NOT a bundle of any CDM project.

12) DOE to be more careful so that this is a genuine CDM project. What is the exact project cost? The project cost is covering what? Each value considered must be validated with proof. The machinery is second hand purchased or fresh and new from an OEM? In either case DOE to check all the quotations, proposals, purchase orders, invoices, way bills, transport bills, proof of payments like bank statements. DOE to check with banks by way of written confirmation the amount transacted, to whom the money is paid, when the money is paid, is the party paid is the correct party as shown in the purchase orders. It may so happen that the values, party names, dates are fabricated and misrepresented in this project. DOE should terminate their contract for this project immediately. This is the only way out to protect the value of CDM process. If the PP is purchasing second hand or second quality equipment and inflating the purchase order values and invoices, this must be probed thoroughly and real values to taken for additionality calculation. Then I'm sure the additionality is not there at all in such a situation.

VT response: Not applicable to the project activity.

13) How is the base line defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the base line as suggested by the PDD. Please check that there are real emission reductions beyond the real and factual base line. It may so happen that this project qualifies for no CER's. DOE cannot assume values and things as giving by this PP. Whatever values are considered throughout the project in all documents including the real DPR (not the one prepared for CDM, the one given to the banks and others), they must be validated, verified and double



checked. Do not ask PP for DPR. Ask the parties who have been given DPR by the PP. Get directly from the bank and others by each page of the DPR and Feasibility report signed. Such document can be considered as a real DPR or FR. UNFCCC CDM process cannot be degraded by fabricating and misinterpreting the project base line and additionality.

VT response: The baseline was crosschecked through onsite assessment and is fully in accordance with the last version of the PDD.



APPENDIX A

CDM VALIDATION PROTOCOL

Project Title and Location

REPORT No. 01 997 9105060490



Table 1: Validation requirements								
(based on § 37 of the CDM Modalities and Procedures and on CDM Validation and Verification Manual, Annex 1 of EB55)								
	Checklist question	Ref.	MoV ¹	Findings, comments, references, data sources	Draft conclusion	Final conclusion		
1.	Approval							
1.1 If ye - -	 Have Letters of Approval been provided from all involved Parties? es, indicate: when and by which Party the LoA has been issued, with a clear reference to the LoA itself and any supporting documentation; whether the LoA was provided to the DOE by the project participants or directly by the DNA; the means of validation employed to assess the authenticity of the document; and by a clear statement, that the DOE considers the LoA to be valid. 	PDD (A.3)	DR	CAR 1: No LoA have been provided yet. As established by Resolution 1 of September 2003 of the Brazilian Ministry of Science and Technology (The Designated National Authority) and ratified and updated by Resolution 7 of 2008, the PDD has to be first validated by an authorized DOE, before being submitted for a letter of approval (LoA) from the Designated National Authority - DNA. This is the procedure which is being followed in the present project. Hence, CAR 1 cannot be deemed closed until the registration of the project.	CAR 1	OPEN		
1.2	Are all Parties, who issued the LoA, Parties to the Kyoto Protocol <u>and</u> is this stated in the LoA?	PDD (A.3)	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN		
1.3	Is every LoA from the Parties involved issued by an organisation listed as Designated National Authority (DNA) on the UNFCCC web site? Indicate the official name of the DNA and contact person name.	PDD (A.3)	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN		

 $^{^{1}}$ MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.



1.4	Is the participation in the CDM project activity voluntary <u>and</u> is this stated in all LoAs? <i>Indicate the source of proof.</i>	PDD (A.3)	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN
1.5	Is the LoA unconditional with respect to 1.2 to 1.4?	PDD (A.3)	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN
1.6	Is the title of the CDM project activity as given in the PDD identical with the title given in all LoAs and Modalities of Communication? <i>Provide Yes/No answer, and include details</i> <i>into Tables 2, 3 and 4 accordingly.</i>	PDD (A.3)	DR	Please see the comment given vide item 1.1. CAR 2: There is no MoC at the moment of Validation.	CAR 1 CAR 2	OPEN CLOSED
1.7	If any of provided LoAs contains additional specification of the CDM project activity (PDD version number, validation report version number, amount of ER, etc.) are those specifications valid and consistent with other documents?	PDD (A.3)	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN
1.8	Does the project activity involve any public funding from Annex I Parties? <u>If yes</u> , has Annex I Party provided a written confirmation that the use of such funding does not lead to the diversion of the official development assistance.	PDD (A.4.4)	DR, I	No, there is no public funding in this project activity. As per interviews with stakeholders like environmental offices of Sabará, and the PPs themselves.		ОК
2.	Participation (VVM E.2)				-	-
2.1	Are the Parties and project participants (PP) listed in the section A.3 of the PDD correctly <u>and</u> is this information consistent with the contact details provided in Annex 1 of the PDD?	PDD (A.3, Annex 1)	DR	Yes, the Parties and the PPs are correctly listed in the section A.3 and in Annex 1.		OK



2.2	Has every Party involved approved the participation of each corresponding PP, either by means of a LoA or by a separate written document? <i>Indicate Yes / No answer and describe all</i> <i>inconsistencies in the Tables 2, 3 and 4</i> <i>accordingly.</i>	PDD (A.3)	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN
3.	Project Design Document (VVM E.3)					
3.1	Is the PDD presented for validation based on the latest template available at the UNFCCC website? Indicate Yes / No answer and describe all inconsistencies in the Tables 2, 3 and 4 accordingly.	PDD	DR	Yes, the PDD template used ("Guidelines for Completing the Simplified Project Design Document (CDM-SSC-PDD) and the Form for Proposed New Small Scale Methodologies (CDM-SSC-NM))" is the most recent available from the website of the UNFCCC in its version 5 of 14 th September 2007.		ОК
3.2	Has the PDD been established in accordance with the CDM requirements for completing PDDs issued by the CDM EB?	PDD	DR	Yes, the PDD is in accordance with the requirements issued by CDM EB.		ОК
4.	Project Description (VVM E.4)					
4.1	Does the PDD contain a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	PDD (Sec. A)	DR	Section A of the PDD is written in such a manner that the technical, geographical and reasons that lead to the decision of the implementation of a better technology are recognized as appropriate and dependable. CAR 3: Geographical coordinates of the project location should be given in decimal system.	CAR 3	CLOSED



4.2 In the case of greenfield project activity, is the project design described sufficiently by means of specifications, drawings and manuals? <i>Provide Yes/No answer and indicate the</i> <i>documents which have been reviewed in</i> <i>relation to the issue.</i>	PDD	DR	This is not considered a greenfield project since they are using gas from an existing plant.		OK		
4.3 Does the project activity reflects current good practices, uses state of the art technology or would the technology result in a significantly better performance, than any commonly used technologies in the host country? <i>Provide the description of how validation has been carried out and what comparisons have been made.</i>	PDD (B.5)	DR	Since the project activity will add an energetic use to methane, which is current flared out without any gain, it is deemed a good practice, because it will reduce consume of electricity from the grid. The technology used is not a common practice in the host country, which has only two other PCTs, but with different capacities, as can be seen in section B.5 of PDD.		OK		
 4.4 In cases where the project activity involves the alteration of an existing installation or process, does the PDD provide a clear description of the differences between the project and the pre-project scenario? <i>Please, provide Yes/Now answer and update Tables 2, 3 and 4 accordingly, if there is anything unclear in the provided description.</i> 	PDD (A.2)	DR	Yes. The differences between the project and the pre-project scenario are described in section A.2 of PDD. The project activity involves the implementation of a PCT (Small Thermoelectric Plant), and not an alteration of an existing installation or process.		ОК		
5. Baseline and Monitoring methodology							
5.1 General requirements	ſ	I					
5.1.1 Is the methodology used in the project activity approved by the CDM EB <u>and</u> is the selected version still valid?	PDD	www	Yes, the methodology (AMS-I.F, version 02) used in the project activity is approved by the CDM EB and is valid from 17 Jun 2011 onwards.		ОК		
5.2 Applicability of the selected methodology							



 5.2.1 Does the project activity qualify under the criteria for small-scale CDM project activities set out in § 6 (c) of decision 17/CP.7 and Annex II of the Modalities and Procedures for the CDM? Please provide Yes/No response and description of how this was validated. 	PDD	www	Yes. The capacity of the project activity does not exceed 15 megawatts. Moreover, the project activity will increase the supply of energy and reduce the anthropogenic emissions in a quantity less than 15.000 tonnes of carbon dioxide equivalent per year. So, according to § 6 (c) of decision 17/CP.7, the project activity is adequate.		ОК
5.2.1.1 If yes, does the PDD extensively demonstrates and confirms that the small- scale project activity is not a debundled component of a larger project? <i>Please indicate Yes/No answer. In case of</i> <i>positive conclusion provide details of the</i> <i>validation measures taken and data found</i> <i>during the procedure. Otherwise amend the</i> <i>Tables 2, 3 and 4 accordingly.</i>	PDD (A.4.5)	www	According to Annex 13 of EB 54 (v. 3) (Guidelines on assessment of debundling for SSC project activities), since there is NOT a registered SSC PA with the same project participants (Source: CDM Pipeline, Riso Institute September 2010), it is taken that this project is NOT a debundled component of a larger project activity.		ОК
5.2.2 Are all applicability conditions of the selected baseline and monitoring methodology and all tools involved satisfied by the project activity? <i>Please indicate Yes/No answer. In case of</i> <i>positive conclusion provide details of the</i> <i>validation measures. Otherwise amend the</i> <i>Tables 2, 3 and 4 accordingly.</i>	PDD	www	CAR 4: The description of GHG emissions inside the project boundary is needed to confirm if the baseline is appropriate. Hence, this issue is still open.	CAR-4	CLOSED
5.2.3 Is the selection of the applied baseline and monitoring methodology justified?	PDD (A.4.2)	DR	The justification for the applied baseline and monitoring methodology is in section A.4.2 of the PDD.		ОК
5.2.4 Is the selected methodology correctly quoted in all related documents?	PDD	DR	Yes, AMS-I.F (V. 02) is correctly quoted in all related documents.		ОК



 5.2.5 Does the PDD sufficiently describe all the GHG emission sources or sinks occurring as a result of project activity, which have not been accounted for under the selected methodology and are expected to contribute more than 1% of the overall expected average annual emission reductions? Provide Yes/No answer. Indicate the sources or sinks of GHG, which were proved to be negligible. Otherwise amend the Tables 2, 3 and 4 accordingly. 	PDD	DR	Please see the comment given vide item 5.2.2.	CAR 4	CLOSED
5.3 Project boundary					
 5.3.1 Does the PDD correctly describe the project boundary? Provide Yes/No answer. And amend the Tables 2, 3 and 4, if needed. 	PDD (B.3)	DR	Yes, the physical boundaries are well described in section B.3 of the PDD.		ОК
5.3.2 Does the PDD correctly indicate and describe the emission sources and sinks of GHG gases that are included in the project boundary?	PDD	DR	Please see the comment given vide item 5.2.5.	CAR 4	CLOSED
5.3.3 In cases where the methodology allows project participants to choose whether a source or gas is to be included in the project boundary, is the choice explained and justified by PPs?	PDD	DR	There is no specification in the methodology about including any gas source.		ОК
5.4 Baseline identification					
5.4.1 Has the procedure contained in the selected methodology to identify the most reasonable baseline scenario been applied correctly and documented in the PDD?	PDD	DR	Yes, the procedure contained in the selected methodology to identify the most reasonable baseline scenario.		ОК
5.4.1.1 Is the identified baseline scenario plausible?	PDD	DR	Yes, the identified baseline scenario plausible.		OK



5.4.1.2 Are all assumptions stated in a transparent and conservative manner?	PDD	DR	CL 1: Assumptions and calculations made to evaluate baseline are not satisfactory.CAR 19: the assessed baseline does not fit to the selected methodology of the version 4 of the PDD.	CL 1 CAR 19	CLOSED
5.4.2 Does the selected methodology require the use of tools <u>and</u> does PDD reflects that correctly?	PDD (B.1)	DR	The tools used are described in section B.1 of the PDD.		ОК
5.4.2.1 Were all the tools applied correctly?	PDD	DR	Yes, all the tools were correctly applied.		OK
5.4.3 In case the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, have all scenarios been considered and have no reasonable alternative scenario been excluded?	PDD	DR	The selected methodology does not require the consideration of several alternative scenarios.		ОК
5.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?	PDD	DR	Please see the comment given vide item 5.4.1.2.	CL-1	CLOSED
5.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the PDD and other reference sources?	PDD	DR	Please see the comment given vide item 5.4.3.1.	CL-1	CLOSED
5.4.6 Does the PDD describe how the national and sectoral policies relevant to the baseline scenario have been identified and considered in the PDD?	PDD (B.5)	DR	There is one topic "Summary of national policies and circumstances relevant to the baseline of the proposed project activity" in section B.5 of the PDD which describe these issues.		OK



5.4.7 Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the project activity?	PDD	DR	The technology that would be used in the absence of the project activity would be the already implemented, which is basically firing methane without energetic use.		OK
5.5 Algorithm and/or formulae used to dete	rmine emis	sion red	uctions		
5.5.1 Are all calculations applied and documented according to the selected methodology and in a complete and transparent manner?	PDD	DR	CL 2: The calculations for electricity generation are not clear.	CL-2	CLOSED
5.5.2 In case the methodology allows a selection between different options for equations or parameters, has adequate justification been given and have the correct equations and parameters been used, in accordance with the methodology selected?	PDD	DR	The methodology does give the option and the PPs have opted for using the tools.		OK
5.5.3 In case some data and parameters will not be monitored throughout the crediting period, but have already been determined and fixed, are all data sources, assumptions and calculations correct, applicable to the proposed CDM project activity and conservative?	PDD (B.6.2)	DR	CAR 5: The "average net energy conversion efficiency of power unit m or k in year y" (EB 50, Annex 14, v.2, page 25) should be set in section B.6.2 of the PDD. CL 3: Please clarify the methods to evaluate parameter EG _{BL,y} .	CAR 5 CL 3	CLOSED
5.5.4 In case data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the PDD for these data and parameters reasonable?	PDD (B.6.2)	DR	CAR 6: Section B.6.2 is not complete.	CAR 6	CLOSED



5.5.5 Have the major risks and uncertainties, which can influence the emission reduction estimates, been identified and addressed in the PDD?	PDD	DR	There is no mention about the risks and uncertainties which can influence the emission reduction estimates in the PDD.		ОК					
5.6 Leakage	5.6 Leakage									
5.6.1 Has the leakage been identified and calculated according to the approved methodology?	PDD (B.6.3)	DR	CAR 7: In section B.6.3 it is said that leakage should be considered. However, these values were not presented.	CAR 7	CLOSED					
5.6.2 Have the leakage been addressed in complete, conservative and substantiated manner?	PDD (B.6.3)	DR	Please see the comment given vide item 5.6.1.	CAR 7	CLOSED					
5.6.3 Are uncertainties in the leakage emission estimates properly addressed?	PDD (B.6.3)	DR	Please see the comment given vide item 5.6.1.	CAR 7	CLOSED					
6. Methodology-related issues for afforest	ation or re	forestatio	on CDM project activities							
Add specific A/R requirements – if applicable!			Not applicable for this CDM project activity	О.К.	0.K.					
7. Additionality										
7.1 Prior consideration of the CDM (VVM E.	6.III.a)				-					
7.1.1 Is there documented evidence provided by the project participants on how and when the decision to proceed with the project activity was taken?	PDD	DR	COPASA has wastewater treatment facilities, which produce biogas from anaerobic digestion. Nowadays, this biogas is flared out, without any gain. Therefore, they have decided to attach an energetic use to it, implementing a small thermoelectric plant (PCT). CAR 8: There is not any document about how and when the PPs decided to proceed with the project activity.	CAR 8	CLOSED					



7.1.2 Is the starting date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms" <u>and</u> CDM VVM (§97)?	PDD (C.1.1)	www	The starting date is in accordance with the "Glossary of CDM terms" since its date corresponds to "the end of the public tender pertaining to design and implementation of improvements in ETE Arrudas including the construction of the PCT". It is also in agreement with the CDM VVM (§97) as the biogas produced		ОК
			will have an energetic use with this project activity.		
7.1.3 Is the date stated in the provided evidence consistent with other available evidence (e.g. dates of construction, purchase orders for equipment)?	PDD (B.5)	DR	CAR 9: The websites supplied in section B.5 of the PDD (Table 4) which present the evidences are not operating. (Date of access: 05/10/10).	CAR 9	CLOSED
7.1.4 If the project was not published and the starting date is on or after 2 nd August 2008, was it possible to receive from UNFCCC secretariat and/or DNA a written confirmation that PPs previously informed the above entities on commencement of the project activity and of their intention to seek CDM status?	PDD (B.5)	DR	In section B.5 of the PDD there is an item "Demonstration and assessment of prior consideration of the CDM" that describe these matters. It was possible to receive from UNFCCC and Brazilian DNA confirmation of receipt of communication of starting date in 13/05/2009.		OK
7.1.5 For the project activities with a starting date before 2 nd August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were previously aware of CDM?	PDD	DR	Not applicable.		OK
7.1.6 For the project activities with a starting date before 2 nd August 2008 and before the actual publication, was there enough evidence presented to prove that CDM benefits have been a decisive factor in the decision to proceed with the project activity?	PDD	DR	Not applicable.		OK



7.1.7 Does the individual or body that took the decision to proceed with the project activity have/had the authority to do so?	PDD	DR	CL 4: Please clarify who took the decision to proceed with the project activity and whether this person has the authority to do so.	CL 4	CLOSED
7.1.8 For the project activities with a starting date before 2 nd August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were taking continuing and real actions to secure CDM status for the project in parallel with its implementation?	PDD	DR	Not applicable.		OK
7.1.9 In case there is a significant gap between the start date of the project activity and the commencement of validation, how was it possible for the project participant to commit funds to the project in advance of receiving a positive validation opinion?	PDD	DR	There is no significant gap between the start date and the beginning of the validation.		OK
7.2 Identification of alternatives					
7.2.1 Does the PDD identify and list credible alternatives to the CDM project activity in order to determine the most realistic baseline scenario, unless selected approved methodology prescribes/identifies the baseline scenario and no further analysis is required?	PDD	DR	CAR 10: There are not alternatives to the CDM project activity listed or identified in the PDD.	CAR 10	CLOSED
7.2.2 Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a CDM project activity?	PDD	DR	Please see the comment given vide item 7.2.1.	CAR 10	CLOSED



 7.2.3 Does the list contain all realistic/credible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the project activity? Note: All alternatives listed in the selected methodology should be included, as well as those not covered by the methodology. 	PDD	DR	Please see the comment given vide item 7.2.1.	CAR 10	CLOSED
7.2.4 Is the exclusion of the alternatives for legal reasons justified? Note: Some alternatives might be illegal, according to the local regulations, but still widely practiced due to lack of enforcement. It should be verified.	PDD	DR	Please see the comment given vide item 7.2.1.	CAR 10	CLOSED
7.3 Investment Analysis					
7.3.1 Are all sources of revenues (including savings) have been considered in the PDD and all calculations?	PDD	DR	No investment analysis was applied.		ОК
7.3.2 Is the type of investment analysis selected correctly in the PDD?	PDD	DR	Please see the comment given vide item 7.3.1.		ОК
7.3.3 Is the selected financial indicator chosen and applied correctly?	PDD	DR	Please see the comment given vide item 7.3.1.		ОК
7.3.4 Is the guidance on IRR calculation and assessment correctly applied? Note: Means of validation should be recorded.	PDD	DR	Please see the comment given vide item 7.3.1.		ОК



7.3.5 In case project participants use values from Feasibility Study Reports (FSR) is it possible to verify that the period between the FSR date and investment decision was reasonably short and FSR values did not change materially?	PDD	DR	Please see the comment given vide item 7.3.1.	ОК
7.3.6 Are all the values consistent between FSR and PDD <u>and</u> are inconsistencies properly justified?	PDD	DR	Please see the comment given vide item 7.3.1.	ОК
7.3.7 Were all the values from FSR applicable and valid at the time of the investment decision?	PDD	DR	Please see the comment given vide item 7.3.1.	ОК
7.3.8 Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants or some verifiable circumstances that have lead to a change in the benchmark?	PDD	DR	Please see the comment given vide item 7.3.1.	ОК
7.3.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM EB?	PDD	DR	Please see the comment given vide item 7.3.1.	ОК
7.4 Barrier analysis				
7.4.1 Are there any issues addressed in the barrier analysis that have a clear impact on the financial viability of the project activity and that shall be assessed by an investment analysis?	PDD (B.5)	DR	According to section B.5 of the PDD, the main barrier that would have an impact on the financial viability would be technological, since the equipments/technology will be imported from USA.	ОК



 7.4.2 Do the listed barriers exist <u>and</u> is their existence substantiated? Note: (a) by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics and/or 	PDD (B.5)	DR	Yes, there is a list with barrier analysis ("Technological barrier" and "Barrier due to prevailing practice") based on independent sources (databases and statistics) as provided in section B.5 of the PDD.	CAR 11	CLOSED
(b) by interviews with relevant individuals: including members of industry associations, government officials or local experts if necessary?			CAR 11: Since the project activity is a small scale, then only one barrier is enough. The Validation Team deems that Technological Barrier is not consistent enough.		
7.4.3 Would any of the identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the possible alternatives, in particular the implementation of the identified baseline scenario?	PDD (B.5)	DR	Both identified barriers ("Technological barrier" and "Barrier due to prevailing practice") prevent the execution of the project activity, but not the operation of the current technology used, since it is a common practice in the region and in the whole country.		OK
7.5 Common practice analysis					
7.5.1 If the PPs claim in the PDD that CDM project activity is the "first of its kind", is it justified?	PDD (B.5)	DR	The PPs made a comparison between others small thermoelectric plants and have concluded that the project is the "first of its kind".		OK
7.5.2 Are the geographical boundaries of the project activity identified correctly?	PDD (B.5)	DR	Yes. The boundaries of the project activity are deemed correct, since they extended them to all process that will use energy produced by the PCT.		OK
7.5.3 Does the PDD provide an explanation why this region was selected and deemed more appropriate <u>and</u> is this explanation traceable and reliable?	PDD (B.5)	DR	Please see the comment given vide item 7.5.2.		OK



7.5.4	4 Are there similar operational project activities, other than CDM activities, "widely observed and commonly carried out" in the defined region? <i>Note: Use official sources and local and</i> <i>industry expertise.</i>	PDD	www	Please see the comment given vide item 7.5.2.		OK
7.5.	5 In case there are similar commercially operated project activities, other than CDM activities, already "widely observed and commonly carried out" in the defined region, are there essential distinctions between the CDM project activity and the other similar activities?	PDD	DR	Please see the comment given vide item 7.5.4.		OK
8.	Monitoring plan					
8.1	Are all parameters required by the selected approved methodology or tool identified <u>and</u> listed in the PDD?	PDD (B.6.2)	DR	Please see the comment given vide item 5.5.4.	CAR 6	CLOSED
8.2	Is the measurement method clearly stated for each value to be monitored and deemed appropriate?	PDD (B.6)	DR	Yes, the measurement method is well described in section B.6 of the PDD.		ОК
8.3	Are values of the ex-ante parameters / monitoring parameters selected correctly and conservative in accordance to methodology or tools?	PDD (B.6.2)	DR	Please see the comment given vide item 5.5.4.	CAR 6	CLOSED
8.4	Is the measurement equipment for each parameter described and deemed appropriate?	PDD (B.7.1)	DR	CAR 12: Some equipments are not described in section B.7.1 of the PDD.	CAR 12	CLOSED
8.5	Is the measurement accuracy addressed and deemed appropriate?	PDD (B.7.2)	DR	The measurement accuracy is presented in section B.7.2 of the PDD.		ОК
8.6	Are procedures in place on how to deal with erroneous measurements <u>and</u> are the corrective actions identified?	PDD	DR	There are no procedures on how to deal with erroneous measurements and nor the corrective actions.		ОК



8.7	Is the frequency of measurement identified and deemed appropriate?	PDD (B.7.1)	DR	Yes, the frequency of measurement identified and considered appropriate.	ОК
8.8	Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	PDD (B.7)	DR	Yes, the monitoring plan, described in section B.7, is in accordance with the methodology in a complete and transparent manner.	OK
8.9	Are the sampling, measurement methods and procedures defined?	PDD	DR	The measurements methods and procedures were presented to the Validation Team and are deemed appropriate.	OK
8.10	Are procedures identified for maintenance of monitoring equipment and installations?	PDD	DR	The procedures for maintenance of monitoring equipment and installations were presented to the Validation Team and are deemed appropriate.	OK
8.11	Are the equipment calibration intervals identified and justified?	PDD	DR	Yes, in the PDD it is said that: "calibration procedures will be performed according to the manufacturer's instructions or, at least, every three years"	ОК
8.12	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	PDD (B.7.2)	DR	The procedures identified for day-to-day records handling are presented in section B.7.2 of the PDD.	OK
8.13	Are the monitoring arrangements described in the monitoring plan feasible within the project design?	PDD (B.7.2)	DR	Yes, the monitoring arrangements are feasible within the project design, which are described in section B.7.2 of the PDD.	OK
8.14	Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by / resulting from the project activity can be reported ex post and verified?	PDD (B.7.2)	DR	Yes, as per section B.7.2 of the PDD, it was possible to deem the procedures sufficient to ensure that the emissions reductions were achieved.	ОК



8.15 Do the PPs make provisions for personnel			According to section B.5 of the PDD,		
training needs?	PDD (B.5)	DR	"Copasa has no previous experience in the operation of electricity generation system. For instance, an external staff [] will be responsible for the PCT's pre- operation and operation, will be contracted for at least one year. During this period ETE Arruda's staff will acquire new skills and know-how for the proper operation of the PCT."		ОК
8.16 Is the authority and responsibility of overall project management clearly described?	PDD	DR	CAR 13: There is no mention on the hierarchy of the project or a management plant is presented.	CAR 13	CLOSED
8.17 Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	PDD	DR	CAR 14: A contingency emergency plan must be presented in case of identified unintended emissions.	CAR 14	CLOSED
8.18 Are procedures identified for review of reported results/data?	PDD	DR	CAR 15: The procedures were not presented.	CAR 15	CLOSED
8.19 Is the data archiving period for this project activity stated in the PDD and appropriate? <i>Note: All archived monitoring data, required</i> <i>for verification and issuance, should be kept</i> <i>for at least two years after the end of the</i> <i>crediting period or the last issuance of CER.</i>	PDD	DR	CAR 16: There is no tool presented for data archiving.	CAR 16	CLOSED
8.2 Monitoring of the leakage					
8.2.1 Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	PDD	DR	Please see the comment given vide item 5.6.1.	CAR 7	CLOSED



8.2.2 ls t ma rea No sha	the choice of project leakage indicators ade according to selected methodology in a asonable and conservative manner? ote: local knowledge and sectoral expertise wall also be considered.	PDD	DR	Please see the comment given vide item 5.6.1.	CAR 7	CLOSED
8.2.3 Is the measurement method clearly stated and deemed appropriate for each leakage value?		PDD	DR	Please see the comment given vide item 5.6.1.	CAR 7	CLOSED
9. Su	ustainable development					
9.1 Do cor CD sus	bes the LoA from the Host country DNA ontain the confirmation that the proposed DM project activity contributes to the stainable development of the host Party?	PDD	DR	Please see the comment given vide item 1.1.	CAR 1	OPEN
9.2 If F bei em pro	PDD indicates any additional environmental enefits of the project, other than GHG nission reductions, were those benefits operly substantiated?	PDD	DR (A.2)	According to section A.2 of the PDD, the project activity also contributes to the net workplace generation, improvement of labor conditions, technological learning and technological development.		ОК
10. Sta	takeholders' consultation and commer	nts				
10.1 We ap	ere the stakeholders identified in propriate and complete manner?	PDD (E.1)	DR	Yes, the stakeholders were properly identified. CAR 17: There is a spelling mistake in the first name of the list set on the section E.1 of the PDD, page 28.	CAR 17	CLOSED
10.2 Are	e the identified stakeholders plausible?	PDD (E.1)	DR	As per interview with the identified stakeholders, the validation team concludes that the stakeholders are plausible.		ОК
10.3 Do inv	bes PDD describe the means being used to vite local stakeholder's comments?	PDD (E.1)	DR	According to the PDD, the stakeholders were invited through letters.		ОК



10.4	Were those means appropriate?	PDD (E.1)	DR	This mean was considered adequate since it is in accordance with the Designated National Authority procedures, defined by Resolution n. 07 of the Interministerial Commission for Global Climate Change (CIMGC).		OK
10.5	Was the project presented to the stakeholders in unbiased manner?	PDD (E.1)	DR	Yes, the project was presented to the stakeholders in unbiased manner.		ОК
10.6	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?	PDD	DR	CAR 18: The letter was sent for some of the stakeholders needed, but not all of them.	CAR 18	CLOSED
10.7	Is a summary of the stakeholder comments provided in the PDD?	PDD (E.2)	DR	Yes, it can be seen on section E.2 of the last version of PDD (V. 03).		ОК
10.8	Has due account of any stakeholder comments been taken by PPs and reflected in the PDD?	PDD (E.2)	DR	Please see the comment given vide item 10.7.		ОК
11.	Environmental impacts					
11.1	Is the documentation supplied by the PPs regarding environmental impacts relevant and accurately reflected in the PDD?	PDD (D.1)	DR	The documentations supplied by the PPs are relevant and are correctly described in the PDD.		ОК
11.2	Is an environmental impact assessment (EIA) required for the CDM project activity? Note: determine by using a review of relevant legislation and local expertise.	PDD (D.1)	DR	An Environmental Impact Assessment is required for large scale projects only, which is not the case. For small scales, an Environmental Assessment Report (RCA) and a correspondent Environmental Control Plan (PCA) are enough to satisfy legal requirements.		OK
11.3	In case an EIA is required, has the EIA has been approved by local authorities and is the outcome accurately reflected in the PDD?	PDD (D.1)	DR	An EIA is not required. Please see the comment given vide item 11.2.		ОК



11.4 Does the PDD include a brief description of the environmental effects of the project, including transboundary?	PDD (B.6.1)	DR	According to the PDD, the emissions will be null for this project activity since it does not use fossil fuel and because the electricity to be used will be self-sourced. CL 5: Please clarify whether the project activity is releasing only CO ₂ and if it is self-sufficient in energy. In case there is an energy surplus in this project activity, than emissions can be deemed as null.	CL-5	CLOSED
11.5 Are those effects properly addressed in the design of the project activity?	PDD (B.6.1)	DR	According to the PDD (section B.6.1), the emissions for this project activity will be null. Please see the comment given vide item B.6.1.	CL-5	CLOSED
11.6 Does the project comply with environmental legislation in the host country?	PDD (D.1)	DR	Yes, the project has a Preliminary and an Installation License n. 057 issued by SUPRAM (Regional Superintendence of Environmental and Sustainable Development).		OK



Tat	ole 2: L	ist of	Requests for Corrective Action (CAR) and Cl	arification (C	CL)	
No.	CAF	R/CL	Observation (CAR/CL)	Reference	Summary of project owner response	Validation team conclusion
1.	x		CAR 1: No LoA have been provided yet.	PDD (A.3)	According to the 3 rd article of Resolution 1 of the Brazilian DNA, for the approval of project activities in the ambit of CDM, project proponents must submit to the Executive Secretariat of the DNA the PDD and its corresponding validation report. Hence, PPs will apply for a LoA once the draft validation report is issued.	Response is accepted. Validation Team will await until insurance of final validation report. OPEN
2.	X		CAR 2: There is no MoC at the moment of Validation.	PDD (A.3)	MoC will be issued once PPs apply for the LoA. Refer to the answer provided to CAR 1.	Response is accepted as valid in order to approve the validation report. Until issuance of LoA. MoC /3/ was obtained. CLOSED
3.	X		CAR 3: Geographical coordinates of the project location should be given in decimal system.	PDD (Sec. A)	Geographical coordinates of the project location in decimal degrees were provided in section (A.4.1.4).	The corrections are valid as correct. CAR is CLOSED.
4.	X		CAR 4: The description of GHG emissions inside the project boundary is needed to confirm if the baseline is appropriate. Hence, this issue is still open.	PDD	A table summarizing the emissions sources included in the project boundary has been included in Section B.3.	The boundaries are now well described and leave no margin of doubt. CAR is CLOSED.
5.	3.10.	x	CL 1: Assumptions and calculations made to evaluate baseline are not satisfactory.	PDD	As stated in section B.4, data pertaining to the ex-ante estimation of $_{EG_{BL,y}}$ was obtained from a study elaborated by Instituto Bioterra (<i>Estudo de viabilidade técnica</i> <i>econômica de cogeração de</i> <i>energia na estação de tratamento</i>	The Validation Team has gone through a revision of the documents as well as confronted with the authors of the sources. The response of the PPs is deemed as correct. CL is



					<i>de esgoto do Arrudas</i> – provided to the DOE, along with its "Annotation of Technical Responsibility"). The same reference is used in the ex- ante calculation spreadsheet. This was made explicit in the new version of the ex-ante calculation spreadsheet.	CLOSED.
6.		X	CL 2: The calculations for electricity generation are not clear.	PDD	Same response as that provided to CL01.	Please see above. CL is CLOSED.
7.	x		CAR 5: The "average net energy conversion efficiency of power unit m or k in year y" (EB 50, Annex 14, v.2, page 25) should be set in section B.6.2 of the PDD.	PDD (B.6.2)	Parameter included in section B.6.2. However, PPs would like to stress that $EF_{grid,OM-DDy}$ and $EF_{grid,BMy}$ are calculated and published by the Brazilian DNA. Hence, depending of the DNA's option of calculation, $\eta_{m,y}$ may or may not be used.	Correction was attended by PPs. CAR is CLOSED.
8.		X	CL 3: Please clarify the methods to evaluate parameter $EG_{BL,y}$.	PDD (B.6.2)	As described in the PDD, for expost measurements, this parameter corresponds to the total electricity consumption minus the internal (parasitic) loads of the project plant. Electricity generation and parasitic loads will be monitored one meter each, as described in the monitoring plan. For ex-ante estimations of $EG_{BL,y}$ the same response as that provided to CL01 applies.	Validation Team deems the answer as correct and will provide measurable results. CL is CLOSED.
9.	x		CAR 6: Section B.6.2 is not complete.	PDD (B.6.2)	See response for CAR 5.	Correction was attended by PPs. CAR is CLOSED.
10.	x		CAR 7: In section B.6.3 it is said that leakage should be considered. However,	PDD (B.6.3)	The previous version of the PDD stated "leakage is expected". However, the word "not" had been	Correction was attended by PPs. CAR is CLOSED.



		these values were not presented.		mistakenly omitted. The revised PDD has been corrected.	
11.	X	CAR 8: There is not any document about how and when the PPs decided to proceed with the project activity.	PDD	According to the 38 th article of Brazilian Federal Law 8,666 (21 st June 1993), the public tender process initiates with the opening of an administrative process duly litigated, registered in a protocol and numbered. In Copasa, the opening of this kind of process is responsibility of the Administrative Board. In 19 th December 2008, the Copasa's Administrative Board approved the opening of the public tender pertaining to the project activity. The corresponding public act is available at <http: <br="" copasa="" www.mzweb.com.br="">web/arquivos/ATA_REUNIAO_CA_ 19_12_09.pdf> and the pathway in Copasa's website is <u>www.copasa.com.br</u> > Relação com Investidores > Informações aos Investidores > Documentos entregues à CVM > Arquivo 2008 > ATAS de AGO, AGE, RCA e RCF > 19/12/2008. There is no direction mention of CDM project, but the content of this text (item 4.2) is 100% about this project, because it is for the tendering process for the building of the system for use of biogas for electricity generation in ETE Arrudas.</http:>	The documents mentioned by PPs have been reviewed by Validation Team, and were considered correct. This document is found under /12/ CAR is CLOSED.



12.	X		CAR 9: The websites supplied in section B.5 of the PDD (Table 4) which present the evidences are not operating. (Date of access: 05/10/10).	PDD (B.5)	Currently functional links provided in the PDD. In addition, a copy of the official publication has been provided in "Dossiê 2" (see "IOF 05 05 2009.pdf" and "IOF 31 01 2009.pdf").	The documents mentioned by PPs have been reviewed by Validation Team, and were considered correct. CAR is CLOSED.
13.		X	CL 4: Please clarify who took the decision to proceed with the project activity and whether this person has the authority to do so.	PDD	Refer to the answer to CAR 8.	The documents mentioned by PPs have been reviewed by Validation Team, and were considered correct. CAR is CLOSED.
14.	x		CAR 10: There are not alternatives to the CDM project activity listed or identified in the PDD.	PDD	Section B.5 has been updated accordingly.	The PPs have updated the section accordingly. CAR is CLOSED.
15.	X		CAR 11: Since the project activity is a small scale, then only one barrier is enough. The Validation Team deems that Technological Barrier is not consistent enough.	PDD (B.5)	For the sake of simplicity, the technological barrier has been removed from the PDD. Aiming reinforcement of the evidences on the project's barrier due to the prevailing practice, the document /28/. In this document, the Research and Development Director of the Environmental Foundation of the Minas Gerais State (FEAM) declares that the project activity is the first of its kind in Minas Gerais State according to the Environmental Data Integrated System of the Environmental and Sustainable Development Secretariat of Minas Gerais State.	The document mentioned by PPs /28/ have been reviewed by Validation Team, and was crosschecked with the source of information. The answer was considered correct. CAR is CLOSED.
16.	x		CAR 12: Some equipments are not described in section B.7.1 of the PDD.	PDD (B.7.1)	Only two electricity meters of the same model (ION 7300) will be used in the monitoring of the project activity (one for the monitoring of	Answer is considered correct and the monitoring system is considered to be complete. CAR is CLOSED.



				the total electricity generation and other for the monitoring of the project plant's internal loads). These meters are involved in the monitoring of the parameters $EG_{PJ,k}$, $EG_{RL,y}$, $EG_{PI,y}$ and EC_{PJy} , as mentioned in section B.7.1. The description of the accuracy specifications of ION 7300 are described in section B.7.2. Moreover, the manufacture's manual containing detailed information on ION 7300 was provided to DOE.	
17.	x	CAR 13: There is no mention on the hierarchy of the project or a management plant is presented.	PDD	Please note that figure 5 presents the management structure of the project activity. Nonetheless the roles and responsibilities from the instances involved in the monitoring of the project activity have been further detailed in the revised PDD.	PPs have included correctly in the new version of the PDD. CAR is CLOSED.
18.	x	CAR 14: A contingency emergency plan must be presented in case of identified unintended emissions.	PDD	As stated in the PDD in section A.4.2 "the existing biogas flares will remain commissioned during the project activity. This is a measure that seeks preparedness for cases where emergencies can cause unintended emissions. For instance, if for any reason during a given moment the biogas could not be stored in the gasholder nor combusted in the PCT, it will be combusted in the existing flares." In that sense, in the moments when the gaseholders present pressure	PPs have provided the proper documentation. CAR is CLOSED.



					higher than the stated security level, the biogas will be automatically conducted to the flares, where it will be combusted (see the screen shot of SCADA, pertaining to the automated control of the valve directing the path of the biogas from the digesters to the gasholders and the co-generation building or to the flares - file "tela GASOMETROS" in "Dossiê 2").	
19.	X		CAR 15: The procedures were not presented.	PDD	See answer to CAR 14.	PPs have provided the proper documentation. CAR is CLOSED.
20.	X		CAR 16: There is no tool presented for data archiving.	PDD	The software and hardware resources of the SCADA system perform data archiving. This fact was mentioned in section A.4.2. The description SCADA has also been included in the monitoring section.	PPs have included correctly in the new version of the PDD. CAR is CLOSED.
21.	X		CAR 17: There is a spelling mistake in the first name of the list set on the section E.1 of the PDD, page 28.	PDD (E.1)	"Major" has been substituted by "Mayor"	The correction have been made by PPs. CAR is CLOSED.
22.	x		CAR 18: The letter was sent for some of the stakeholders needed, but not all of them.	PDD	PPs understand that all stakeholders required by DNA's Resolution 7 have been invited. Please, recheck.	Validation Team reviewed the DNA documents and the procedures applied by the PPs are correct. CAR is CLOSED.
23.		x	CL 5: Please clarify whether the project activity is releasing only CO_2 and if it is self-sufficient in energy. In case there is an energy surplus in this project activity, than emissions can be deemed as null.	PDD (B.6.1)	The biogas will be combusted by the highly efficient microturbines for electricity generation. For Type I small-scale applications of the energetic potential of biogas (i.e. electricity generation), the methane destruction efficiency is deemed as	Answer is deemed as correct. CAR is CLOSED.



		4000/ Massa and the station	
		100%. Moreover, the existing	
		biogas flares will remain	
1		commissioned. Hence, it can be	
		considered that within the project's	
		facilities only neutral CO, omissions	
		activities, only neutral CO ₂ emissions	
		resulting from the compustion of the	
		biogas will take place in result of the	
		project activity.	
		The electricity produced by the	
		project activity will be consumed	
1		within the boundaries of ETE	
		Arrudas. As explained in the PDD.	
		the electricity that will effectively	
		displace the consumption of grid	
		displace the consumption of gift	
		electricity, thus leading to emissions	
		reductions, corresponds to the	
		difference between the total	
		electricity production minus the	
		internal loads of the PCT. The PDD	
		has been revised to account for	
		nossible project emissions arising	
		from executional cituations in which	
		from exceptional situations in which	
		internal (parasitic) loads of the	
		project plant (PCT) exceed the	
		electricity generation, thus leading	
		to grid electricity consumption.	
		However, for the purposes of ex-	
		ante estimations project emissions	
		will be considered as pull	
		Please note that "project plant"	
		refers to the PCT (Pequena Central	
		Tormolótrico Small Thormoclostric	
		Plant), included in the project	



				boundary, whereas "ETE Arrudas" refers to the whole wastewater treatment plant where the PCT or "project plant" is located.	
24.	X	CAR 19: the assessed baseline does not fit to the selected methodology of the version 4 of the PDD. The CARs are only generated on the base of energy generation, there is no use within the project boundaries of cogeneration.	PDD (Section B)	 Please note that PDD is currently at its fifth version, which employs AMS.I-F/Version 01. AMS.I-F only accounts emission reduction from renewable electricity generation. The text below was extracted from the revised PDD: "As per AMS-I.F/Version 01, paragraph 14, "baseline emissions () are the product of amount of electricity produced by the renewable generating unit and an emission factor". Moreover, AMS-I.F/Version 01, paragraph 14, states "emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D". According to AMS.I-D/Version 16, paragraph 12 "the emission factor can be calculated in a conservative manner as follows: (a) A combined margin (CM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system'. 	Accepted and the CAR 19 is closed


	OR (b) The weighted average emissions (in t CO ₂ /MWh) of the current generation mini- The data of the year in which project generation occurs mutures be used".	2 1 2 1 t t
	Taking the guidance above int account, since the project plan displaces electricity that woul otherwise be supplied by SIN baseline emissions will be calculate as the product of the net electricit generation (total electricit generation minus parasitic loads and SIN's combined margin (CM emission factor.") t 1 , 1 , 1 , 7 , 1 , 7 , 1 , 7 , 1 , 7 , 1 , 7 , 7



Table 3: List of forward action requests (FARs)						
FAR number	Reference	Summary of project owner response	Validation team conclusion			
FAR01						

APPENDIX B

CERTIFICATES OF COMPETENCE