



RINA

VALIDATION OPINION FOR RENEWAL OF THE CREDITING PERIOD


Final

“Central Energética do Rio Pardo Cogeneration Project
("CERPA")”
in
Brazil


Validation Opinion N° 2010-BQ-MD-22

Revision N° 1.1

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Project Title: "Central Energética do Rio Pardo Cogeneration Project ("CERPA")		Country: Brazil	CDM Registration Reference N°: 0209	
Client: CERPA – Central Energética Rio Pardo Ltda		Client contact: Mr. Sylvio Ortega		
Report No.: 2010-BQ-MD-22		Revision: 1.1	Date of this report: 16/05/2011	
Approved by (Final Report – DCI Director approval):  Roberto Cavanna			Date of approval: 17/05/2011	
Methodology				
Number: ACM0006	Version: 10.1 of 30/07/2010	Title: "Consolidated methodology for electricity generation from biomass residues in power and heat plants"	Scale Large	SS(s): 01
<p>RINA Services S.p.A. (RINA), commissioned by CERPA – Central Energética Rio Pardo Ltda, has performed the validation for renewal of the crediting period for the registered project activity "Central Energética do Rio Pardo Cogeneration Project ("CERPA") in Brazil.</p> <p>In conclusion, it is RINA's opinion that the project meets the requirements for the renewal of the crediting period stated in the "Procedures for renewal of the crediting period of a registered CDM project activity" (version 05, EB 46 - Annex 11) and the approved methodology ACM0006, version 10.1 of 30/07/2010. The original baseline of the first crediting period is confirmed to be still valid.</p> <p>Hence RINA requests the renewal of the crediting period of the project activity "Central Energética do Rio Pardo Cogeneration Project ("CERPA")" in Brazil.</p>				

Work carried out by: Geisa Maria Principe Branco Saettoni, Thaís de Lima Carvalho, Américo Varkulya Jr	<input checked="" type="checkbox"/> No distribution without permission from the Client or organizational unit responsible <input type="checkbox"/> Strictly confidential <input type="checkbox"/> Unrestricted distribution
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Work verified by (Final Report – CRT person responsible approval)  Paolo Teramo	Keywords: Climate Change, Kyoto Protocol, Clean Development Mechanism, Validation
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Abbreviations

ANEEL	“ <i>Agência Nacional de Energia Elétrica</i> ” - Brazilian Electric Energy Agency
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CIFOR	Center for International Forestry Research
CIMGC	“ <i>Comissão Interministerial de Mudança Global do Clima</i> ” (Interministerial Commission on Global Climate Change)
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
ONS	“ <i>Operador Nacional do Sistema Elétrico</i> ”- National Electric System Operator (National dispatch center)
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SIN	“ <i>Sistema Interligado Nacional</i> ” - National Interconnected System
SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
ÚNICA	“ <i>União da Indústria de Cana-de-Açúcar</i> ” – Brazilian Sugarcane Industry Union
VVM	Validation and Verification Manual

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1 INTRODUCTION

CERPA – Central Energética Rio Pardo Ltda has commissioned RINA to carry out the validation of the updated PDD version 02 of 29/04/2011 /8/ for the CDM project activity “Central Energética do Rio Pardo Cogeneration Project (“CERPA”)” project in Brazil for the renewal of the crediting period for this project. The second renewable crediting period for the project ends on 30/04/2017.

This report summarizes the findings from the validation of the updated PDD of the project, performed on the basis of UNFCCC criteria for CDM, as well as criteria given by the “Procedure for renewal of the crediting period of a registered CDM project activity (version 05, EB 46 - Annex 11).

1.1 Objective

The objective of the Validation is to have an independent evaluation of the updated PDD’s compliance with relevant UNFCCC requirements and host Party criteria to confirm that the original project baseline was updated taking into account of new data where applicable. In particular, the project’s baseline, monitoring plan and the project’s compliance with relevant UNFCCC requirements and host Party criteria are validated in order to confirm the correctness of the application of the approved baseline methodology, ACM0006, “Consolidated methodology for electricity generation from biomass residues in power and heat plants” version 10.1 of 30/07/2010, for the determination of the continued validity of the baseline/or its update, and estimation of the emission reductions for the applicable crediting period, from 01/05/2010 or the renewal date of this project activity, whichever is later, to 30/04/2017, reported for the “Central Energética do Rio Pardo Cogeneration Project (“CERPA”)” project in Brazil.

1.2 Scope

The validation scope is to review the updated PDD against the UNFCCC criteria for CDM.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

This validation opinion is also to be seen in conjunction with the validation report and protocol submitted at the time of requesting registration of the project (DNV Validation Report No. 2005-0635, revision no. 02 of 23/12/2005 /28/).

The Validation Opinion is not meant to provide any consultancy 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

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Manual, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation of the updated PDD is consequence of the verification activity which consisted of the following three phases:

- Document review
- Follow-up actions;
- The resolution of outstanding issues and the issuance of the final validation opinion report.

The validation opinion is issued within nine to six months prior to the date of expiration of the current crediting period.

The following sections outline each step in more detail.

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2.1 Document Review

The updated PDD version 02 of 29/04/2011 /8/, in particular the applicability of the methodology, the baseline determination, the emission reduction calculations provided in the form of a spreadsheet, "CERPA_second_period_calculation scenario 18_CERs_v2_20110429.xls", version 2 dated 29/04/2011 /24/ and the documents listed in the table below, were reviewed during the validation.

/1/	Ecopart Assessoria em Negócios Empresariais Ltda: CDM-PDD for project activity "Central Energética do Rio Pardo Cogeneration Project ("CERPA") in Brazil, version 01 of 13/12/2010.
/2/	CDM Executive Board: Validation and Verification Manual, version 01.2 of 30/07/2010.
/3/	CDM Executive Board: Baseline and monitoring methodology "ACM0006", "Consolidated methodology for electricity generation from biomass residues in power and heat plants", version 10.1 of 30/07/2010.
/4/	Ecopart Assessoria em Negócios Empresariais Ltda: CER's Spreadsheet Calculation "CERPA_second period_calculation CERs_20101213 v1.xls", version 01 of 13/12/2010.
/5/	Ecoinvest carbon Assessoria Ltda.: CDM-PDD for project activity "Central Energética do Rio Pardo Cogeneration Project ("CERPA") in Brazil, version 4b of 21/12/2005.
/6/	CDM Executive Board: Baseline and monitoring methodology AM0015, "Bagasse-based cogeneration connected to an electricity grid" version 01 of 22/09/2004.
/7/	CDM Executive Board: "Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity", version 05 of 25/03/2011, EB 46 - Annex 11.
/8/	Ecopart Assessoria em Negócios Empresariais Ltda: CDM-PDD for project activity "Central Energética do Rio Pardo Cogeneration Project ("CERPA") in Brazil, version 02 of 29/04/2011 (<i>latest updated PDD version</i>).
/9/	Ministry of Science and Technology / MCT Interministerial Commission on Global Climate Change – CIMGC: Resolution # 8, dated 26/05/2008. Available at < http://www.mct.gov.br/index.php/content/view/72738.html >, accessed on 15/03/2011 (only in Portuguese).
/10/	Ministry of Science and Technology / MCT Interministerial Commission on Global Climate Change – CIMGC: emission factor data, available at < http://www.mct.gov.br/index.php/content/view/307492.html >, accessed on 15/03/2011 (English version).
/11/	CDM Executive Board: ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1.0 of 17/09/10.
/12/	CDM Executive Board: "Tool to calculate the emission factor for an electricity system", version 2.1, dated 15/04/2011.
/13/	Equipalcool Sistemas Ltda.: "Letter demonstrating the lifetime of boiler employed by project activity", dated 16/02/2011.
/14/	NG Metalúrgica Ltda: "Letter demonstrating the lifetime of steam turbines employed by the project activity", dated 23/02/2011.
/15/	E-mail from Dedini S/A Indústria de Base: "eficiência caldeiras" (<i>boilers efficiency</i>), dated 20/08/2008, sent by Mr. Flavio Maltempi Ferreira.
/16/	Usina da Pedra: "Spreadsheet Data Collection Measurement (from Portuguese - Planilha de Coleta de Dados da Medição) Document number RQ-CER-001-1, version 3, dated 30/07/2008.
/17/	Usina da Pedra ; Operational Procedure : CERPA's Data Collection (from Portuguese – Coleta de Dados da CERPA) , Document number PO-CER-008-1, version 05, dated 13/05/2010.
/18/	Usina da Pedra; Operational Procedure: Monthly Energy Data Collection (from portuguese Coleta de Dados Mensal de Energia) Document number PO-CER-007-1, version 03, dated 13/05/2010.
/19/	Usina da Pedra, Standard Procedure: CERPA's Monitoring System (From Portuguese <i>Sistema de Monitoramento da CERPA</i>) Document number NP-CER-001-1, version 06, dated 12/01/2011.
/20/	Usina da Pedra Operational Procedure: Sampling and Analysis for Determining Sugarcane Sucrose Content (from Portuguese: <i>Amostragem de cana e análise para determinação de teor de sacarose</i>) Document number PO-LAB-001-1, version 4, dated 11/09/2009.

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/21/	Specification of Test Method: Determination Sugarcane's Moisture, bagasse and Filter Cake (from Portuguese: <i>Determinação da Umidade da cana, bagaço e torta de filtro</i>) Document number MT-LAB-011-1, version 4, dated 23/06/2010.
/22/	Usina da Pedra: Spreadsheet (" <i>bagaço% cana.xls</i> ") with an example of the calculation of the percentage of bagasse on sugar cane and print screen of the program employed on this calculation, dated 04/04/2011.
/23/	Sugarcane Technology Center: Determination of Low Heat value and High Heat Value (from Portuguese – <i>Determinação do Poder Calorífico Superior e Inferior</i>), document number CTC-LA – MT6-008, version 2, dated 07/05/2010.
/24/	Ecopart Assessoria em Negócios Empresariais Ltda: CER's Spreadsheet Calculation "CERPA_second_period_calculation_scenario_18_CERs_v2_20110429.xls", version 2 dated 29/04/2011.
/25/	Tecnosugar; Flow diagram pants "Balance of direct steam, sugarcane bagasse and electric Energy – phase 2", revision 5, dated 16/07/2009.
/26/	Brazilian Electric Energy Agency - ANEEL Decree # 129, dated 24/02/2011.
/27/	Brazilian Electric Energy Agency - ANEEL Resolution # 394, dated 23/07/2002.
/28/	DNV: Validation Report No. 2005-0635, revision 02 of 23/12/2005.
/29/	Ministry of Science and Technology – MCT Interministerial Commission on Global Climate Change – CIMGC: Notes of explanation (emission factor), available at < http://www.mct.gov.br/upd_blob/0024/24834.pdf >, accessed on 09/05/2011 (English version).
/30/	TUV NORD "Central Energética do Rio Pardo Cogeneration Project (CERPA)", Final Verification Report - 4th Period, Report No: 6314 – 09/133, dated 12/01/2011.
/31/	USDA Foreign Agriculture Service: GAIN Report – Brazil Biofuels Annual 2010 (prepared by Sergio Barros), dated 30/07/2010. Available at < http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_Sao%20Paulo%20ATO_Brazil_8-11-2010.pdf >, accessed on 15/03/2011 (in English).
/32/	CIFOR: Info Brief #35 – December 2010 - The role of national governance systems in biofuel development. Available at < http://www.cifor.cgiar.org/publications/pdf_files/infobrief/3308-infobrief.pdf >, accessed on 15/03/2011 (in English).
/33/	CTC: CTC Study, revision 0 - Determinação da eficiência elétrica das usinas brasileiras para produção exclusiva de açúcar e/ou etanol (<i>Reference plants efficiency study</i>), dated 17/05/2010. Available at < http://www.ctcanavieira.com.br/site/media/Usina_Referencia_MDL_r0a.pdf >, accessed on 15/03/2011 (in Portuguese).
/34/	Única – brochure "Sugarcane industry in Brazil" and presentation "Sugarcane in Brazil: The Sustainable Expansion" - World Biofuels Market Congress, 18/03/2009 Brussels. Available at < http://www.unica.com.br/multimedia/publicacao/Default.asp?sqlPage=2 >, accessed on 15/03/2011 (in English).
/35/	CDM Executive Board - "Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of crediting period" – Annex 1, version 05 of 25/03/2009 (EB 46 - Annex 11).
/36/	CDM Executive Board: "Combined tool to identify the baseline scenario and demonstrate additionality", version 3.0 dated 15/04/2011.
/37/	CDM Executive Board: DNA's information. Available at http://cdm.unfccc.int/DNA/index.html , accessed on 15/03/2011 (in English).
/38/	CDM Executive Board: CERPA Project's information – Project participants / LoA's. Available at http://cdm.unfccc.int/Projects/DB/DNV-CUK1135325819.41/view , accessed on 15/03/2011 (in English).
/39/	References related to Brazilian mills not using fossil fuel in their sugar and/or bioethanol production process and bagasse storage: - UNICA: Statement that all energy utilized in the Brazilian mills industrial process is generated from firing of bagasse (biomass residues from their sugar and/or bioethanol production). Available at http://www.unica.com.br/content/show.asp?cntCode=%7b0C8534A8-74A7-4952-8280-C5F6FB9276B7 , accessed on 15/03/2011 (in Portuguese);

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- Centro Nacional de Referência em Biomassa – CENBIO (*Biomass National Reference Center*): *Green house gases emissions in the production and use of ethanol from sugarcane in Brazil: The 2005/2006 averages and a prediction for 2020* - Article from Isaias C. MACEDO, Joaquim E.A. SEABRA and João E.A.R. SILVA, published in BIOMASS AND BIOENERGY periodical. Available at http://cenbio.ief.usp.br/download/publicacoes/macedo_et_al-balance2020.pdf, accessed on 15/03/2011 (in English).

2.2 Follow-up actions

On 09/02/2011, RINA visited the project's site, located at Serrana Municipality, to resolve questions and issues identified during the document review of the updated PDD related to the renewable crediting period from 01/05/2010 or the renewal date of this project activity, whichever is later, to 30/04/2017.

The key personnel interviewed and the main topics of the interviews are summarized in the table below.

	Date	Name and Role	Organization	Topic
/a/	09/02/2011	Adriana Berti / Technical Analyst	EQAO (former Ecoinvest & former Ecopart)	Review estimated emission reductions and project emissions calculations (assumptions, calculations, sources). Check the reference plant. Reliability of internal and external data). Evidences of the historic data of energy generation; Evidences regarding operational parameters of boilers and steam turbines included in the project activity
/b/	09/02/2011	Eduardo Brondi / Responsible by CDM	CERPA	Assessment of the project and installation of all equipment as described by the PDD (project-equipment/s specifications and operational lifetime/s evidences). Metering equipment accuracy / calibration-maintenance procedures-frequency / supporting evidences-records (processes and equipments/instruments involved - possible leakages). Confirm the existing installed capacity of equipments at the facility, and equipments of the project activity. Check assured energy/ operation lifetime, and project participant. PPA contracts;
/c/	09/02/2011	Daniel G. / Engineering Manager	Usina da Pedra	
/d/	09/02/2011	Agenor Branco Jr / Manager	Usina da Pedra	
/e/	09/02/2011	Matheus Carvalho / Manager	Usina da Pedra	
/f/	10/02/2011	Wanderlei Monta / Development Coordinator	Usina da Pedra	Position and role of each person in the GHG data management process clearly defined/implemented (correct implementation of the GHG Management and operational system). Operating staff competence and the risks for inappropriate operation and data collection procedures of the project. Check the procedures identified for training of monitoring personnel/ training records. All required and/or relevant routine processes (procedures-instructions-records), and documentations for
/g/	10/02/2011	Amanda Ap. Valente / Human Resources Analyst	Usina da Pedra	

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				proper application. Information flows for generating, aggregating/collating and reporting the selected monitored parameters.
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2.3 Resolution of outstanding issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to RINA's positive validation opinion for the renewal of the crediting period.

2.4 Internal quality control

All the revisions of the validation opinion before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

2.5 Validation team and the technical reviewer(s)

The validation team and the technical reviewers consist of the following personnel:

Role	Last Name	First Name	Country
Team Leader CDM	Principe Branco Saettoni	Geisa Maria	Brazil
CDM Validator / Technical expert	Varkulya Jr	Américo	Brazil
CDM Validator	De Lima Carvalho	Thaís	Brazil
Technical Reviewer	Valoroso	Rita	Italy
Technical Reviewer	Teramo	Paolo	India

3 VALIDATION FINDINGS

The findings of the validation related to the project, as described in the updated PDD version 02 of 29/04/2011 /8/, are stated in Appendix A of this report.

3.1 Project activity details

Project UNFCCC reference	0209
Date of registration	09/03/2006
Title of the project activity	"Central Energética do Rio Pardo Cogeneration Project ("CERPA")
Methodology(ies)	ACM0006, version 10.1 of 30/07/2010 - "Consolidated methodology for electricity generation from biomass residues in power and heat plants"
Renewable crediting period	From 01/05/2010 or the renewal date of this project activity, whichever is later, to 30/04/2017

The project increased the efficiency and the capacity of the previous bagasse based cogeneration system used to generate steam and electricity for internal consumption by the installation of a high-pressure boiler and a multiple stage backpressure turbine coupled with two new 15 MW generators that provided an additional 30 MW generation capacity to the previously installed capacity of 10 MW. The installed total generation capacity is equal to 24 MW and is calculated considering the plant load factor and the operational season period (Installed capacity * Plant load factor * months of operation/months of the year = 40 MW * 0.9 * 8/12).

According to the "Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity" /7/, project participant notified the Secretariat of their intention to request a renewal of a crediting period of the

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registered CDM project activity within the required nine to six months period (deadline date = 31/10/2009), prior the date of expiration of the current (first) crediting period, but the selected DOE was informed afterwards (after the deadline date) and therefore the project participant shall not be entitled to the issuance of certified emission reductions for the period from the expiration date of the current (first) crediting period until the date on which the second crediting period is deemed renewed.

During the site visit, all equipments of this project activity were verified and their operational conditions are in line with table 2-5 on Section "2.5 - Technical Project Description" described on the latest available Final Verification Report /31/ and in line with Section A.4.3 of PDD version 2 /8/. Beyond the operational conditions, the following characteristics of CDM project's equipments were verified:

Boiler

Manufacturer: EQUIPALCOL Sistemas;

Boiler type: 150 V-2-S;

Manufactured in 2002;

Manufacturing number: 068-02;

Steam nominal production: 150 t/hour;

Maximum steam production: 165 ton/hour;

Operational pressure: 65 kgf/cm²;

Temperature 480 °C.

Generator – TG 4

Manufacturer: Toshiba;

Serial number: 012021001;

Installed Capacity: 18,750 kVA;

Power Factor; 0,8.

Manufactured in 10/2002 (refurbished in 03/2010 - installed power not modified)

Steam turbine of TG 4

Manufacturer – NG Metalúrgica Ltda;

Model: H3/630S;

Installed Power: 17,300 kW;

Inlet pressure: 66 kgf/cm²;

Extraction pressure: 2,5 kgf/cm²;

Outlet pressure: 0.19 kgf/cm²;

Order number: 4.1.0186;

Temperature: 475 °C;

Manufactured in 12/2002.

Generator – TG 3

Manufacturer: Toshiba;

Serial number: 012021000;

Installed Capacity: 18,750 kVA;

Power Factor; 0,8;

Manufactured in 10/2002 (refurbished in 03/2010 - installed power not modified).

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Steam turbine of TG 3

Manufacturer – NG Metalúrgica Ltda;

Model: H3/630S;

Installed Power: 17,000 kW;

Inlet pressure: 63 kgf/cm²;

Outlet pressure: 1.5 kgf/cm²;

Order number: 4.1.0188;

Temperature: 475 °C;

Manufactured in 12/2002.

3.2 Participation requirements

The project's host Party is Brazil and the Annex I Parties are United Kingdom of Great Britain and Northern Ireland and The Netherlands. Brazil, United Kingdom of Great Britain and Northern Ireland and The Netherlands fulfill the requirements to participate in the CDM. All parties involved in this project activity have ratified the Kyoto protocol and established a DNA as the participating requirements for CDM under the Kyoto Protocol.

Brazil ratified the Kyoto Protocol on 23/08/2002 and established as DNA the Interministerial Commission on Global Climate Change, as per the UNFCCC website /37/.

United Kingdom of Great Britain and Northern Ireland ratified the Kyoto Protocol on 31/07/2002 and established as DNA the Global Carbon Markets and The Netherlands ratified the Kyoto Protocol on 31/07/2002 and established as DNA the Ministry of Infrastructure and the Environment, as per the UNFCCC website /37/.

The project participants are CERPA – Central Energética Rio Pardo Ltda from Brazil, Ecopart Assessoria em Negócios Empresariais Ltda, from United Kingdom of Great Britain and Northern Ireland¹, and BHP – Billiton Marketing AG from The Netherlands. All participants are private entities. The project participants are correctly listed in table A.3 of the PDD and the information is consistent with the contact details provided in Annex 1 of the PDD version 02 of 29/04/2011 /8/. Project participants and parties (host and other parties) are also in line with the ones currently presented in the UNFCCC site /38/.

3.3 Application of latest approved version of a baseline and monitoring methodology.

The project was originally registered as a CDM project, based on version 01 of the approved baseline methodology AM0015 - "Bagasse-based cogeneration connected to an electricity grid" /6/ of 22/09/2004, with a renewable (7 years) crediting period, from 01/05/2003 to 30/04/2010.

The updated PDD, version 02 of 29/04/2011 /8/, applies version 10.1 of 30/07/2010 of the approved consolidated baseline and monitoring methodology ACM0006, "Consolidated methodology for electricity generation from biomass residues in power and heat plants" /3/ and all sections related to the baseline, estimated emission reductions and the monitoring plan were updated as per the applied methodology. This procedure is line with paragraph 2 (b) of the "Procedures for Renewal of the Crediting Period of a Registered CDM Project Activity" /7/, once the original baseline methodology AM0015 was withdraw and replaced by the consolidated methodology ACM0006, after the registration of the CDM project activity.

¹ The project participant Ecopart Assessoria em Negócios Empresariais Ltda. is a company based in Brazil, which holds a CER account in the UK Greenhouse Gas Emissions Trading Scheme Registry and became a project participant in the project through this country approval in order to use its CER account.

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3.4 Assessment of the validity of the original/current baseline and to update the baseline at the renewal of a crediting period.

RINA assessed the validity of the original baseline scenario or its update and the corresponding estimation of emission reductions for the second crediting period based on the methodological tool “Tool to assess the validity of the original/current baseline and to update the baseline at the renewal of crediting period” /35/, the approved consolidated baseline and monitoring methodology ACM0006 version 10.1 /3/ and the means of validation described in the VVM /2/.

The following steps have been applied to evaluate whether the current baseline is still valid for the next crediting period (from 01/05/2010 or the renewal date of this project activity, whichever is later, to 30/04/2017) and to update the baseline in case that the current baseline is not valid anymore for the next crediting period.

Step 1: assess the validity of the current baseline for the next crediting period.

RINA has assessed the impact of new relevant national and/or sectoral policies and circumstances on the baseline, using the following Sub-steps.

Step 1.1: assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.

RINA confirms, through the assessment of public information /31/ /32/ and its local experience, that there have been no changes in the relevant national and/or sectoral regulations since the previous crediting period.

Step 1.2: assess the impact of circumstances

When the project activity was registered (09/03/2006), the Brazilian emission factor was calculated based on data published by the Brazilian DNA and provided by ONS (National Electric System Operator) and considering the South-Southeast-Midwest regions (subsystems). After project's registration, the Brazilian DNA, (CIMGC) in its 43rd Meeting, on 29/04/2008 /29/, “decided to adopt a **SINGLE SYSTEM** as the pattern for CDM projects using the tool for calculating emission factors associated with the ACM0002 methodology to estimate their greenhouse gas reductions”, and also pointing out “the expansion of electricity transmission support between the subsystems will promote gradual reductions in transmission constraints and will enable a project implemented in a given subsystem to produce benefits in the other subsystems of the SIN”. Furthermore, the Interministerial Commission on Global Climate Change (CIMGC) through its Resolution # 8 /9/, dated 26/05/2008, and with effect on the date of its publication, decided:

“Art. 1st – Adopt the single system comprised of the union of National Interconnected System (NIS) subsystems as a definition of the “Project Electric System” for any Clean Development Mechanism (CDM) project activity connected to the NIS, supplying or using electricity from the grid, and applying the ACM0002 and AMS-I.D. methodologies and/or the “Tool to calculate the emission factor for an electricity system” approved by the CDM Executive Board.

Sole paragraph - This definition, when applicable, shall be extended to any other methodologies dealing with project activities connected to the grid that come to be approved by the CDM Executive Board, unless expressed otherwise in a deliberation by this Commission”.

Therefore, for the second period, the Brazilian grid emission factor was updated based on the latest published available OM and BM emission factors of the Brazilian National Interconnected System, which are calculated by the Brazilian DNA (CIMGC) /10/ according to the “Tool to calculate the emission factor for an electricity system” and considering the National Interconnected System - SIN (North, Northeast, South and Southeast-Midwest), as stated in the Resolution # 8 /9/.

Step 1.3: assess whether the continuation of the use of current baseline equipment(s) is technically possible.

PDD version 02 of 29/04/2011 /8/, applied the approved consolidated baseline and monitoring methodology ACM0006 version 10.1 of 30/07/2010 /3/. Project participants properly applied the scenario 18 of ACM0006 that defines the situation that would have occurred in the absence of the project activity, as follows:

“The project activity involves the replacement of an existing biomass residue fired power and heat plant by a new biomass residue fired power and heat plant. The replacement increases the power generation capacity. In the absence of the project activity, the existing plant would also be replaced by a new biomass residue fired power and heat plant (referred to as .reference plant.), however, this reference plant would have a lower

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efficiency of electricity generation than the project plant (e.g. by using a low-pressure boiler instead of a high-pressure boiler). The same type and quantity of biomass residues as in the project plant would be used in the reference plant. Consequently, the power generated by the project plant would in the absence of the project activity be generated (a) in the reference plant and since power generation is larger in the project plant than in the reference plant. (b) partly in power plants in the grid. The new project plant has the same technical lifetime as the reference plant. The heat generated by the project plant would in the absence of the project activity be generated in the reference plant”.

Thus, in summary, in the absence of the project activity, electricity generation would be from the reference plant and from the power plants connected to the grid.

Regarding the equipments employed by project activity, project participants provided a letter from Equipalcool Sistemas Ltda (boiler manufacturer), dated 16/02/2011, signed by Mr. Carlos Henrique Dalmazo (Mechanical Engineer) confirming that the lifetime of boilers achieve 25 years /13/, since properly operated. Also the steam turbines manufacturer´s, NG Metalúrgica Ltda, provided a letter dated 23/02/2011, signed by Mr. Matheus C. Franhani (Project Engineer) and Mr. José A. Mari (Engineer Manager) confirming that the lifetime of steam turbines achieves 20 years /14/.

The reference plant would have a lower efficiency of electricity generation than the project plant and the new project plant would have the same technical lifetime as the reference plant and therefore this step is not applicable.

Step 1.4: assessment of the validity of the data and parameters.

The registered PDD version 4b, dated 21/12/2005 /5/ presented the baseline calculation (baseline emissions) in line with the baseline methodology AM0015 /5/, multiplying the surplus of electric energy produced by project activity and delivered to Brazilian national grid, by the Brazilian grid emission factor (measured in kg CO₂e/kWh).

At the second crediting period, baseline emissions were updated as per ACM0006 version 10.1 of 30/07/2010 /3/. The net quantity of increased electricity generation is determined based on the average net efficiency of electricity generation in the reference plant and the average net efficiency of electricity generation in the project plant after project implementation and the baseline emissions are the result of this net quantity of increased electricity generation multiplied by the updated Brazilian grid emission factor.

For the first crediting period, the combined margin (CM) emission factor, applying the Simple Adjusted method, was calculated *ex ante* as the weighted average ($W_{OM} = 0.5$ and $W_{BM} = 0.5$) of the operating margin (OM) and build margin (BM) emission factors, based on data published by the Brazilian DNA and provided by ONS (National Electric System Operator) and considering the South-Southeast-Midwest regions (subsystems).

The Brazilian grid emission factor estimated (*ex ante*) at the start of the first crediting period is not longer valid and thus has to be updated and the PDD version 02 of 29/04/2011 /8/ is using the latest EF grid data (2009 data), which was available at the time of the start of the validation of the renewal of the crediting period (December 2010). Therefore, for the second crediting period, the *ex ante* estimative for the Brazilian grid emission factor was calculated using the latest available emission factor (2009) of the Brazilian grid system for 2009 (CM=0.1214 tCO₂/MWh - average OM=0.2476 tCO₂/MWh and BM=0.0794 tCO₂/MWh), made publicly available by the Brazilian DNA /10/, and considering the National Interconnected System - SIN (North, Northeast, South and Southeast-Midwest). Moreover, the Brazilian grid emission factor for the second crediting period was correctly calculated, using the proper weighted average ($W_{OM} = 0.25$ and $W_{BM} = 0.75$), as required by Tool to calculate the emission factor for an electricity system.

Data was checked against the Brazilian DNA web site (Base year 2009) /10/ and found correct.

The combined margin emission factor ($EF_{grid,CM,y}$) will be calculated/updated *ex post* using the publicly available CO₂ emission factors for the build margin and the operating margin, that are provided by the Brazilian DNA. CO₂ emission factors for the build margin and the operational margin for electricity generation in Brazil's National Interconnected System (SIN) are calculated, according to the dispatch analysis, from generation records of plants dispatched in a centralized manner by the National Electric System Operator (ONS).

Step 2: update the current baseline and the data and parameters.

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Step 2.1: update the current baseline.

The PDD version 4b, dated 21/12/2005 /5/ was registered applying the approved baseline methodology AM0015 - "Bagasse-based cogeneration connected to an electricity grid" /6/ version 01 of 22/09/2004 and the baseline emissions were calculated multiplying the surplus of electric energy produced by project activity and delivered to Brazilian national grid, by the Brazilian grid emission factor (measured in kg CO₂e/kWh). As already mentioned in the previous step, the Brazilian grid emission factor for the second crediting period was updated.

APPLICABILITY

The baseline methodology ACM0006, version 10.1 of 30/07/2010 was correctly applied to the project activity. The project activity consists on the installation of a new biomass residue cogeneration plant, which replaces an existing cogeneration plant that fires the same type of biomass residue as in the project plant. Moreover, the project activity also contemplates the following criteria of the applied baseline methodology:

- **No other biomass types than biomass residues are used in the project plant** – it was verified during the site visit that boilers employed by the project activity only burn sugarcane bagasse generated from the sugarcane crushing process at the project site;
- **The implementation of the project shall not result in an increase of the processing capacity of sugarcane** – it was demonstrated on PDD version 2 and confirmed by RINA /34/ that possible increases on sugarcane capacity occurs only due to market conditions and not due to the implementation of the project activity;
- **The biomass residues used by the project facility is not be stored for more than one year** – the surplus of sugarcane bagasse after the ending of crops season is employed in the start up of the sugar mill in the next season, in a period of less than one year, as verified and confirmed during the site visit through proper records;
- **No significant energy quantities, except from transportation or mechanical treatment of the biomass residues, are required to prepare the biomass residues for fuel combustion** – it was verified during the site visit that the sugarcane bagasse does not present any chemical or mechanical treatment before being burnt in the project activity boilers.

The updated PDD, version 02 of 29/04/2011 /8/, submitted for the renewal of crediting period applies the approved baseline methodology ACM0006, "Consolidated methodology for electricity generation from biomass residues in power and heat plants" version 10.1 of 30/07/2010 /3/ and the "Combined tool to identify the baseline scenario and demonstrate additionality" /36/. Therefore, the original baseline scenario (as per AM0015) was updated to the ACM0006 baseline scenario 18. According to this methodology, the baseline scenario and the baseline emission calculation depends on realistic and credible alternatives, which are determined regarding:

- How power would be generated in the absence of the CDM project activity;
- What would happen to the biomass residues in the absence of the project activity;
- In case of cogeneration projects: how the heat would be generated in the absence of the project activity.

Below follows RINA's assessment of the above alternatives, considering all power, heat and biomass baseline scenarios:

➤ **How power would be generated in the absence of the CDM project activity**

P1: The proposed project activity not undertaken as a CDM project activity – this alternative is not applicable in case of renewal of crediting period;

P2: The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-)fired in the project activity – as the project activity involves the increase on power generation, as presented on registered PDD, it would not be possible to consider the employment of the existing power plant with the same configuration;

P3: The generation of power in an existing plant, on-site or nearby the project site, using only fossil fuels – it was verified during the site visit that there is no generation based on fossil fuel at the project site;

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P4: The generation power in the grid – considered plausible alternative to the project activity – in case of project activity did not delivery the surplus of electricity to the grid, such amount of energy would be supplied by Brazilian Interconnected grid;

P5: The installation of a new biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case – considered a plausible alternative to the project activity;

P6: The installation of a new biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity. The power output is the same as in the project case – the new plant would process the same amount (not higher) of biomass residues (bagasse) as in the project activity and the core business of the company (sugar mill) is the production of sugar and bioethanol, to which the production of biomass residues is related, and not the power generation - any possible future increase in biomass residues availability would be due to the natural expanding business (production increase of sugar and/or bioethanol) and not because of the implementation of the CDM project;

P7: The retrofitting of an existing biomass residue fired power, fired with the same type and with the same annual amount of biomass residues as the project activity, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project plant and therefore with a lower power output than in the project case – the retrofitting of the existing biomass power plants, keeping the same operational parameters and the same annual biomass consumption would not be able to achieve the increase of electricity generation presented on registered PDD;

P8: The retrofitting of an existing biomass residue fired power that is fired with the same type but with a higher annual amount of biomass residues as the project activity and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant industry sector) than the project activity. – alternative not applicable to the project activity due to the same reason presented to alternative P7;

P9: The installation of a new fossil fuel fired captive power plant at the project site. – it was verified during the site visit that there is no generation based on fossil at the project site and Brazilian sugar mills do not use to fire fossil fuel in their sugar and/or bioethanol production process /39/;

P10: The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The project activity plant burns only bagasse (biomass residues) – not applicable alternative, the new plant would process the same amount (not lower) of biomass residues (bagasse) as in the project activity and the core business of the company (sugar mill) is the production of sugar and bioethanol, to which the production of biomass residues is related, and not the power generation - any possible future increase in biomass residues availability would be due to the natural expanding business (production increase of sugar and/or bioethanol) and not because of the implementation of the CDM project;

P11: The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site. – Alternative not applicable - it was verified during the site visit that there is no generation based on fossil fuel at the project site (the project activity plant burns only bagasse -biomass residues) and Brazilian sugar mills do not use to fire fossil fuel in their sugar and/or bioethanol production process /39/.

➤ ***In case of cogeneration projects: how the heat would be generated in the absence of the project activity***

H1: The proposed project activity not undertaken as a CDM project activity - this alternative is not applicable in case of renewal of crediting period;

H2: The proposed project activity (installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation (e.g. an efficiency that is common practice in the relevant industry sector) - considered plausible alternative to the project activity;

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H3: The generation of heat in an existing cogeneration plant, on-site or nearby the project site, using only fossil fuels – it was verified during the site visit that there is no generation based on fossil at the project site and Brazilian sugar mills do not use to fire fossil fuel in their sugar and/or bioethanol production process /39/;;

H4: The generation of heat in boilers using the same type of biomass residues – the boilers employed on pre project power plant are not able to produce the amount of steam required by project activity;

H5: The continuation of heat generation in an existing cogeneration plant, fired with the same type of biomass residues as in the project activity, and implementation of the project activity, not undertaken as a CDM project activity, at the end of the lifetime of the existing plant – the boilers in the pre-project plant do not have the capacity to generate the same amount of heat for the process as the boilers of the project activity and the proposed project activity not undertaken as a CDM project activity is not a plausible alternative;

H6: The generation of heat in boilers using fossil fuels – alternative not applicable to the project activity due to same reason presented on alternative H3;

H7: The use of heat from external sources, such as district heat - alternative not applicable to the project activity due to same reason presented on alternative H3;

H8: Other heat generation technologies (e.g. heat pumps or solar energy) – there is not another source/technology for heat generation at the project site;

H9: The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The project activity plant burns only bagasse (biomass residues) – not applicable alternative, the baseline plant would have a lower - and not the same- rated power capacity, since it would not export electricity to the grid, and would use the same annual amount (not lower) of biomass residues (bagasse) as in the project activity - as the core business of the company (sugar mill) is the production of sugar and bioethanol, to which the production of biomass residues is related, and not the power generation - any possible future increase in biomass residues availability would be due to the natural expanding business (production increase of sugar and/or bioethanol) and not because of the implementation of the CDM project.;

H10: The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site.– alternative not applicable to the project activity due to same reason presented on alternative H3.

➤ ***What would happen to the biomass residues in the absence of the project activity.***

B1: The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields – not applicable to the project activity once the sugarcane bagasse was always used for energy purposes by Brazilian sugar mills /39/ and, as verified and confirmed during the site visit through proper records, the surplus of sugarcane bagasse after the ending of crops season is employed in the start up of the sugar mill in the next season, in a period of less than one year;

B2: The biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters. This does not apply to biomass residues that are stock-piled or left to decay on fields - alternative not applicable to the project activity due to same reason presented on alternative B1;

B3: The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes. - alternative not applicable to the project activity due to same reason presented on alternative B1;

B4: The biomass residues are used for heat and/or electricity generation at the project site. – plausible alternative to the project activity – CERPA project uses only bagasse as biomass residues (*a by-product of the production of sugar and/or bioethanol*);

B5: The biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants – as the common practice in Brazil, the sugar mills employee the bagasse generated from sugar cane crushed at the mill to obtaining energy for their internal consumption;

B6: The biomass residues are used for heat generation in other existing or new boilers at other sites – alternative not applicable to the project activity due to same reason presented on alternative B5;

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B7: The biomass residues are used for other energy purposes, such as the generation of biofuels - alternative not applicable to the project activity due to same reason presented on alternative B5;

B8: The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry) - alternative not applicable to the project activity due to same reason presented on alternative B5.

Therefore, from the above, it can be depicted that the combination of the baseline scenarios P4 and P5, H2 and B4 indicates and confirms that scenario 18 is the most plausible baseline scenario.

All the alternatives described by project participants on PDD version 02 of 29/04/2011 are in compliance with all current relevant mandatory national and/or sectoral policies.

Step 2.2: update the data and parameters.

As already mentioned (step 1.4), the Brazilian emission factor was correctly calculated (updated) for this second crediting period.

As result of the application of the approved baseline methodology (ACM0006) in this second crediting period, project participants included on PDD version 02 the parameter $\epsilon_{\text{el, reference plant}}$ (*Average net energy efficiency of electricity generation in the .reference plant that would be installed in the absence of the CDM project activity*) as a parameter available at validation (not monitored). The value of this parameter was defined as equal to 0.036 and this value was confirmed by RINA in a CTC Study /33/.

PARAMETERS AVAILABLE AT VALIDATION

* $EF_{\text{BMgrid},y} = 0.0794 \text{ tCO}_2/\text{MWh}$ - CO_2 build margin emission factor for grid electricity during the year y ;

* $EF_{\text{OMgrid},y} = 0.2473 \text{ tCO}_2/\text{MWh}$ - CO_2 operating margin emission factor for grid electricity during the year y ;

Note: $EF_{\text{grid},y} = 0.1214 \text{ tCO}_2/\text{MWh}$ - CO_2 emission factor for grid electricity during the year y - calculated *ex-ante* using the available $EF_{\text{BMgrid},y}$ and $EF_{\text{OMgrid},y}$ parameters (latest OM and BM emission factors made publicly available by the Brazilian DNA) with the following weighted average: $W_{\text{OM}} = 0.25$ and $W_{\text{BM}} = 0.75$.

* $\epsilon_{\text{el, reference plant}} = 0.0363 \text{ MWh}_{\text{el}} / \text{Mwhbiomass}$ (in case of scenario 18, $\epsilon_{\text{el, reference plant}} = \epsilon_{\text{el, baseline plant}}$) - Average net energy efficiency of electricity generation in the reference plant that would be installed in the absence of the CDM project activity.

3.5 Monitoring

The project applies the approved monitoring methodology ACM0006 "Consolidated methodology for electricity generation from biomass residues in power and heat plants" version 10.1 of 30/07/2010 /3/, which replaced the original methodology AM0015 "Bagasse-based cogeneration connected to an electricity grid" version 01, of 22/09/2004 /6/, associated with the approved monitoring methodology "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1.0.

The monitoring plan is in accordance with the applied monitoring methodologies and will give opportunity for real measurement of achieved emission reductions.

RINA has checked all the parameters presented in the monitoring plan against the requirements of the methodologies and no deviations relevant to the project activity have been found.

RINA confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the means of implementation of the monitoring plan are sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported *ex post* and verified.

3.5.1 Monitored data for project emission

There are no project emissions ($PE_y = 0$) associated to this project activity (please see section 3.5.4) and thus no data has to be monitored.

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3.5.2 Monitored data for leakage

Leakage emissions were not verified ($Ly=0$) as there is no diversion of biomass residues from other uses to the project plant as a result of the project activity as there is no diversion of biomass residues from other uses to the project plant as a result of the project activity and biomass residues (bagasse) are produced inside the project boundary and there is no transportation. Therefore, no data has to be monitored.

3.5.3 Monitored data for baseline emissions

The following parameters were included in PDD version 2, dated 29/04/2011:

- **EG_{project plant}** (MWh) - Net quantity of electricity generated in the project plant during the year y – as verified during the site visit it will be measured based on energy meters connected to project plant and cross checked with receipts from electricity sales and/or declaration from the buyer. During the site visit, the following procedures of energy measurement were verified:
 - ✓ Quality Register, Subject: Spreadsheet Data Collection Measurement /16/;
 - ✓ Operational Procedure PO-CER-008-1 - monitoring of energy generation /17/;
 - ✓ Operational Procedure PO-CER-007-1 - registering and publishing of energy readings /18/;
 - ✓ CERPA's Monitoring System NP-CER-001-1/19/.
- **EG_y** (MWh) – Net quantity of increased electricity generation as a result of the project activity during the year y - calculated according to equation 2, in PDD's section B.6.1 {scenario 18 ACM0006 version 10.1 of 30/07/2010 formula (16)} - CERPA will measure the quantity of exported electricity, the quantity of electricity consumed internally. This data will be monitored by the project proponent through energy meters and double checked by CCEE registration and reports of generated energy.
- **BF_{bagasse,y}** - Quantity of bagasse combusted in the project plant during the year y) – On-site indirect measurements - Monitored continuously through an annual energy balance and adjusted (calculated) based on the percentage of fiber in cane and of bagasse in fiber (Adjusted for the moisture content in order to determine the quantity of dry biomass - laboratory results and plant program /22/). During the site visit, the following procedures related to bagasse measurement adopted by CERPA were verified:
 - ✓ Operational Procedure PO-LAB-001-1, which describes on its item 7 the formula applied on calculation of fiber /20/;
 - ✓ Specification of Test Method: Determination Sugarcane's Moisture, bagasse and Filter Cake /21/;
 - ✓ Spreadsheet with an example of the calculation of the percentage of bagasse on sugar cane /22/.
- **NCV_k** (GJ/ton) - Net calorific value of bagasse (dry biomass basis)- the measurement is done according to procedures defined by the Sugarcane Technological Center (CTC from Portuguese – Centro de Tecnologia Canavieira) - taking at least three samples for each measurement, every six months - Consistency of the measurements will be checked by comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC:
 - ✓ Document number CTC-LA –MT6-008. (CTC is an important reference of the sugar-based ethanol in Brazil) /23/.
- **Moisture content of the biomass residues** – The moisture content will be continuously monitored for each batch of biomass of homogeneous quality. The weighted average will be calculated for each monitoring period and used in the calculations - mean values calculated at least annually - this parameter applies the following procedure:
 - ✓ Specification of Test Method: Determination Sugarcane's Moisture, bagasse and Filter Cake /21/

3.5.4 Estimation of the GHG emissions for the renewal crediting period

The total GHG emission reductions from the "Central Energética do Rio Pardo Cogeneration Project ("CERPA") are estimated to be 79,649 tCO₂e during the second renewable crediting period, starting from

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01/05/2010 or the renewal date of this project activity, whichever is later, to 30/04/2017 and resulting in an annual average emission reductions of 11,378 tCO₂e / year.

PROJECT EMISSIONS: as per ACM0006 version 10.1 of 30/07/2010, none of the following project emissions sources were identified:

- CO₂ emissions from transportation of biomass residues to the project site (PE_{Ty}) – as biomass residues (bagasse) are produced inside the project boundary and there is no transportation;
- CO₂ emissions from on-site consumption of fossil fuels due to the project activity (PE_{FFy}) - it was verified during the site visit that there is no generation based on fossil at the project site and Brazilian sugar mills do not use to fire fossil fuel in their sugar and/or bioethanol production process /39/;
- CO₂ emissions from electricity consumption – the project activity supplies all internal consumption needs (self sufficient);
- CH₄ emissions from the combustion of biomass residues (PE_{Biomass, CH_{4,y}}) - it is assumed that this possible emission source is very small and there is no uncontrolled burning or decay of biomass residues in the baseline scenario;
- CH₄ emissions from waste water CO₂ emissions from consumption of electricity (PE_{EC,y}) – the bagasse do not suffers any waste water (chemical) or mechanical treatment, as verified during the site visit.

LEAKAGE: As per ACM0006 version 10.1 of 30/07/2010, the main potential source of leakage consists on an increase in emissions from fossil fuel combustion or other sources due to diversion of biomass residues from other uses to the project plant as a result of the project activity. Leakage emissions are equal to zero (Ly=0) as there is no diversion of biomass residues from other uses to the project plant as a result of the project activity and biomass residues (bagasse) are produced inside the project boundary and there is no transportation.

Emission reductions due to the displacement of electricity are calculated by multiplying the net quantity of increased electricity generated with biomass residues as a result of the project activity with the CO₂ baseline emission factor for the electricity displaced due to the project.

The net quantity of increased electricity generation is determined based on the average net efficiency of electricity generation in the reference plant and the average net efficiency of electricity generation in the project plant after project implementation and the baseline emissions are the result of this net quantity of increased electricity generation multiplied by the updated Brazilian grid emission factor.

For the first crediting period, the combined margin (CM) emission factor, applying the Simple Adjusted method, was calculated *ex ante* as the weighted average ($W_{OM} = 0.5$ and $W_{BM} = 0.5$) of the operating margin (OM) and build margin (BM) emission factors, based on data published by the Brazilian DNA and provided by ONS (National Electric System Operator) and considering the South-Southeast-Midwest regions (subsystems).

The Brazilian grid emission factor estimated (*ex ante*) at the start of the first crediting period is not longer valid and thus has to be updated and the PDD version 02 of 29/04/2011 /8/ is using the latest EF grid data (2009 data), which was available at the time of the start of the validation of the renewal of the crediting period (December 2010). Therefore, for the second crediting period, the *ex ante* estimative for the Brazilian grid emission factor was calculated using the latest available emission factor (2009) of the Brazilian grid system for 2009 (CM=0.1214 tCO₂/MWh - average OM=0.2476 tCO₂/MWh and BM=0.0794 tCO₂/MWh), made publicly available by the Brazilian DNA /10/, and considering the National Interconnected System - SIN (North, Northeast, South and Southeast-Midwest). Moreover, the Brazilian grid emission factor for the second crediting period was correctly calculated, using the proper weighted average ($W_{OM} = 0.25$ and $W_{BM} = 0.75$), as required by Tool to calculate the emission factor for an electricity system.

The average net energy efficiency of electricity in the project plant ($\epsilon_{el, project plant}$) is calculated as the division of the net electricity generation in the year ($EG_{project plant, y} = 118,656$ MWh) by the amount of bagasse fired (energy units - Bagasse NCV * Bagasse consumption = 2.04 MWh/ton * 337,082 Metric tones) and equals to 0.1726.

RINA assessed all data sources used to determine emission reductions and confirms that all estimates of the baseline emissions can be replicated using the data and parameter values provided in the updated PDD. The

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GHG emission reduction calculations, presented in the spreadsheet “CERPA_second_period_calculation scenario 18_CERs_v2_20110429.xls” /24/, were verified by RINA and found correct, conservative and applicable to the proposed CDM project activity, therefore resulting in a conservative estimate of the emission reductions.

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4 VALIDATION OPINION

RINA Service Spa (RINA) has performed a validation of the updated PDD (version 02 of 29/04/2011) for the project activity “Central Energética do Rio Pardo Cogeneration Project (“CERPA”)” in Brazil CDM Registration Reference N° 0209. The validation of the updated PDD has performed for the second renewal crediting period (from 01/05/2010 or the renewal date of this project activity, whichever is later, to 30/04/2017) and is based on the information made available to us.

RINA has performed this validation on the basis of the following documents:

- Procedures for renewal of the crediting period of a registered CDM project activity (EB46 Annex 11 of 25 March 2009);
- Clean Development Mechanism Validation and Verification version 01.2 of 30/07/2010;
- Approved baseline and monitoring methodology ACM0006, version 10.1 of 30/07/2010 - “Consolidated methodology for electricity generation from biomass residues in power and heat plants” (which replaced the withdraw baseline and monitoring methodology AM0015 version 01).

It is RINA’s opinion that the project meets the requirements for the renewal of the crediting period stated in the “Procedures for renewal of the crediting period of a registered CDM project activity”.

Hence RINA requests the renewal of the crediting period of the project activity “Central Energética do Rio Pardo Cogeneration Project (“CERPA”)” in Brazil.

Brazil, 16/05/2011



Geisa Maria Principe Branco Saettoni
CDM Team Leader
RINA Brazil

Genova, 17/05/2011



Paolo Teramo
Authorized officer signing for the DOE
RINA Services S.p.A.

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APPENDIX A

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TABLE 2 RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

Corrective action and/ or clarification requests	Response by project participants	Validation Conclusion
CAR 1 The “Figure 6 - Electricity Grid – Operation units. Source: BIG - ANEEL, 2010” on Section B.4., page 20 of PDD indicates that the installed capacity of power plants from sugar cane bagasse represents 5,10 % of the power plants in operation in Brazil. The table 2, described on page 20, section B.5., sub step 1.1 indicates that the installed capacity of sugar cane power plants represents 3,38%. Project participants are requested to clarify the difference between the figure 6 and table 2. Moreover provide evidences related to the mentioned values.	Figure 6 and Table 2 were updated considering the most recent data available at ANNEL website: http://www.aneel.gov.br/aplicacoes/capacidadebrasil/OperacaoCapacidadeBrasil.asp According to ANEEL, the installed capacity of power plants from sugar cane bagasse represents 5.17% of Brazilian energy matrix. Please, refer to section B.4 and B.5 of the second version of the PDD in order to access the revised information.	The PDD version 2, dated 29/04/2011 /8/ was revised accordingly. This CAR is closed.
CAR 2 Project participants described on section B.4 sub step 2b, page 20 of PDD that “...According to Dedini, a manufacturer of boilers, the efficiency of a low-pressure boiler with pressure of 42 kgf/cm2 is similar to the efficiency of a 66 kgf/cm2 boiler, while the efficiency of a 21 kgf/cm2 boiler is lower...”. Project participants are requested to provide evidences related to this information obtained from Dedini manufacturer and also demonstrate that the similarity between boiler efficiencies are also applicable to boilers employed by project activity.	Please refer to the attached documents, where Dedini informed EQAO team about this efficiency and similarity. As well as Dedini boilers characteristics. Dedini provided an expert opinion, as suggested by the VVM (paragraph 84, 85 and 145 of Means of Validation EB55 Annex 1).	The mentioned communication from Dedini manufacturer and the evidence demonstrating that Dedini’s boiler efficiencies are applicable to boilers employed by project activity was provided /24/ and found adequate. This CAR is closed.
CAR 3 The section B.6.3 of PDD presents information in Portuguese (page 34 and page 35). Project participants are requested to revise the PDD and provide all texts and information in English.	Section B.6.3 was revised. Please, refer to the second version of the PDD.	The PDD version 2 was revised accordingly. This CAR is closed.
CAR 4 On section B.4, sub-step 2b of PDD, project participants described that the project activity corresponds to scenario 18 of baseline and	Please check version 2 of the PDD. Section B.6.1 and B.6.3 were revised providing formula to calculate scenario 18, as described in section B.4. Check also the second version of the calculation	The PPD version 2 was revised accordingly. Project participants provided the spreadsheet “CERPA_second_period_calculation scenario 18_CERs_v2_20110429”, correctly applying

VALIDATION OPINION FOR RENEWAL OF THE CREDITING PERIOD

Corrective action and/ or clarification requests	Response by project participants	Validation Conclusion
monitoring methodology ACM0006, version 10, applied to renewal of crediting period of “Central Energética do Rio Pardo Cogeneration Project (‘CERPA’) – SECOND CREDITING PERIOD” The section B.6.1 of the same PDD and spreadsheet with CERs calculations “CERPA_second period_calculation CERs_20101213 v1.xls” applies the formula of scenario 13 of ACM 0006, version 10. Project participants are requested to revise the PDD and the spreadsheet (if applicable) and also provide evidences related to all assumption applied on CERs calculation.	spreadsheet with scenario 18 calculation. All the information presented in the PDD and the spreadsheet is provided in the flow diagram and attached document. Please check the enclosure.	scenario 18 of ACM0006 version 10 for CERs calculation. This CAR is closed.
CAR-5 PDD section B.7.2 must mention the monitoring frequency of all monitored parameters.	The monitoring frequency of the monitored parameters was included in section B.7.2. Please, refer to the second version of the PDD.	The PDD version 2 was revised accordingly. The procedures related to measurement of parameters were provided. This CAR is closed.
CAR-6 Project participants are requested to include on section B.7.2 of PDD the procedures related to the control and calculation of sugarcane bagasse to be burnt by the boilers of project activity.	The burnt bagasse is monitored analytically through the difference of the bagasse directed to the stock and the daily processes cane (from the milling process, that comprises the milling of sugar cane per hour times the monitoring of % Fiber/cane – provided by Pol and Brix analysis – such as provided by CONSECANA). In summary, the amount of produced bagasse from the milling process minus the bagasse to the stock, it is given analytically the amount of burnt bagasse in CERPA.	The calculation and related procedures were included on section B.7.2, as requested. This CAR is closed.
CL-1 The website http://www.aneel.gov.br/aplicacoes/capacidadebrasil/CombustivelListaUsinas.asp?classe=Biomassa&combustivel=13&fase=3 , accessed on December 2010 described on page 36 of PDD is not available. In case of website	The website link http://www.aneel.gov.br/aplicacoes/capacidadebrasil/CombustivelListaUsinas.asp?classe=Biomassa&combustivel=13&fase=3 was revised. Please, refer to the second version of the PDD and in order to accesses the website copy and paste the link in the internet browser.	The website http://www.aneel.gov.br/aplicacoes/capacidadebrasil/CombustivelListaUsinas.asp?classe=Biomassa&combustivel=13&fase=3 was revised and it is available on PDD version 2 page 49. The file “FSP-2007.10.17-Termeletricas dominam leilao de energia.pdf” related to the

VALIDATION OPINION FOR RENEWAL OF THE CREDITING PERIOD

Corrective action and/ or clarification requests	Response by project participants	Validation Conclusion
<p>(http://www1.folha.uol.com.br/fsp/opiniao/fz1001200801.htm) presented on Section B.5, step 1.1, of PDD, the new mentioned by project participants is available only to subscribers of the newspaper or website.</p> <p>Project participants are requested to provide evidences of the information related to the mentioned websites.</p>	<p>The “Folha” editorial is attached to this response.</p>	<p>mentioned newspaper article was provided.</p> <p>This CL is closed.</p>
<p>CL2</p> <p>It was verified, during the site visit that the equipments (boilers and steam turbines) of a power plant that operates next to CDM project activity were replaced by more efficient equipments. Project participants are requested to provide evidences demonstrating that the operation of such power plant does not impact on the operation of CDM project activity.</p>	<p>It is shown in the flow diagram designed by TECNOSUGAR (third company of engineering dedicated to the sugarcane sector that aims to bring to clients planning and technology solutions). CERPA boiler (# 1 – Existing boiler in purple) has no connection to the rest of the boilers as well as the energy equipments with the other boilers and turbo-generators. The PP also stresses that there are 2 different companies dealing with those 2 different projects, as can be seen in the ANEEL Dispatch of the newest project whose owner is CPFL Bio Pedra S.A. (different from Central Energética Rio Pardo Ltda.) Please find the enclosure.</p>	<p>The flow diagram provide by project participants “Balance of direct steam, sugarcane bagasse and electric Energy – phase 2, revision 5 ,dated 16/07/2009 elaborated by Tecnosugar /25/ (file “Issue 3 and 6_Balanço_CERPA_2011_REV5.pdf”), demonstrates that the operation of project activity’s is not affected by the operation of the retrofitted power plant that operates next to CDM project activity. According to the provided flow diagram, CERPA power plant will consume 68.18 tons of bagasse/hour and it will produce a total power of 24.25 MW (6.25 MW for internal consumption and 18.00 MW for export to the grid).</p> <p>It was also verified and confirmed, based on ANEEL Decree # 129, dated 24/02/2011 /26/, that the new power plants (next to CDM project activity) are owned by CPFL Bio Pedra S.A.</p> <p>CERPA power plant, as described in ANEEL’s Resolution # 394, dated 23/07/2002 /27/, is owned by Central Energética do Rio Pardo Ltda – CERPA.</p> <p>This CL is closed.</p>



RINA

CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Geisa Maria Principe Branco Sabettoni

è qualificato come¹:
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, VCS-VAL,
VCS-VER, VCS-TL, GS-VAL, GS-VER, GS-TL, SCS-VAL,
SCS-VER, SCS-TL, CDM-FIN-EXP**

per le seguenti aree tecniche:
for the following technical areas:

1.2, 13.1

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
2-Energy generation from renewable energy sources	TA 1.2	1	1
1-Waste handling and disposal	TA 13.1	13	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	27-08-2009	-
1	25-03-2010	Annual revision
2	18-10-2010	Changes in certificate module
3	17-03-2011	Changes due to new accreditation standard

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
TEC-FIN: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard:
GS: Gold Standard
SCS: Social Carbon Standard
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA, quale Validatore/Verificatore VCS, per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, quale Validatore/Verificatore GS, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute quale Validatore/Verificatore SCS, per condurre la Validazione e la Verifica di rapporti SCS

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RINA

CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Thais De Lima Carvalho

è qualificato come¹:
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP,
VCS-VAL, VCS-VER, VCS-TL, GS-VAL, GS-VER, GS-TL,
SCS-VAL, SCS-VER, SCS-TL

per le seguenti aree tecniche:
for the following technical areas:

1.2

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
2-Energy generation from renewable energy sources	TA 1.2	1	1

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19-08-2009	-
1	14-12-2009	Changes in module structure
2	23-04-2010	Annual Revision
3	18-10-2010	Changes in certificate module
4	17-03-2011	Changes due to new accreditation standard

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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RINA

CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Americo Junior Varkulya

è qualificato come¹:
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-FIN-EXP
GS-VAL, GS-VER
SCS-VAL, SCS-VER**

per le seguenti aree tecniche:
for the following technical areas:

1.1, 13.1

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
1-Thermal energy generation from fossil fuel and biomass including thermal electricity from solar	TA 1.1	1	1
1-Waste Handling and Disposal	TA 13.1	13	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	30-01-2009	-
1	04-05-2009	Annual Revision
2	14-12-2009	Changes in module structure
3	27-04-2010	Annual Revision
4	18-10-2010	Changes in certificate module
5	17-03-2011	Changes due to new accreditation standard

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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RINA

CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Rita Valoroso

è qualificato come¹:
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER, CDM-TL, CDM-FIN-EXP
VCS-VAL, VCS-VER, VCS-TL
GS-VAL, GS-VER, GS-TL
SCS-VAL, SCS-VER, SCS-TL**

per le seguenti aree tecniche:
for the following technical areas:

1.2, 13.1

AREA TECNICA <i>TECHNICAL AREA</i>	CODICE RINA <i>RINA CODE</i>	SCOPO SETTORIALE <i>SECTORAL SCOPE</i>	CODICE RINA <i>RINA CODE</i>
2-Energy generation from renewable energy sources	TA 1.2	1	1
1-Waste Handling and Disposal	TA 13.1	13	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE <i>REVISION</i>	DATA <i>DATE</i>	MOTIVAZIONI PER LA REVISIONE <i>REASON FOR THE REVISION</i>
0	18-01-10	-
1	03-05-10	Annual Revision
2	18-10-10	Changes in certificate module
3	04-01-11	Removed TAs taken through the ETS/EPD verifications/validations
4	17-03-11	Changes due to new accreditation standard

Il Responsabile di Schema
Schema Manager

Il Resp. Tecnico della Divisione
Head of CRT

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RINA

CERTIFICATO DI QUALIFICA GHG GHG QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Paolo Teramo

è qualificato come¹:
is qualified as:

**CDM-TEC, CDM-VAL, CDM-VER
VCS-VAL, VCS-VER
GS-VAL, GS-VER**

per le seguenti aree tecniche:
for the following technical areas:

1.1, 4.4, 5.1, 8.2, 10.2, 11.1, 13.1

AREA TECNICA TECHNICAL AREA	CODICE RINA RINA CODE	SCOPO SETTORIALE SECTORAL SCOPE	CODICE RINA RINA CODE
1-Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	TA 1.1	1	1
4-Refinery	TA 4.4	4	4
1-Chemical process industries	TA 5.1	5	5
2-Oil and gas industry, coal mine methane recovery and use	TA 8.2	8	8
2-Oil and gas industry, coal mine methane recovery and use	TA 10.2	10	10
1- Chemical process industries	TA 11.1	11	11
1-Waste Handling and Disposal	TA 13.1	13	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	31-01-2008	-
1	27-05-2009	Annual revision
2	25-09-2009	Added validation qualification
3	13-11-2009	Added qualification in C103
4	14-12-2009	Changes in module structure
5	06-05-2010	Annual revision
6	18-10-2010	Changes in certificate module
7	04-01-2011	Removed TAs taken through ETS/EPD verifications/validations
8	17-03-2011	Changes due to new accreditation standard

Il Responsabile di Schema
Scheme Manager

Il Resp. Tecnico della Divisione
Head of CRT

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