



# PERIODIC VERIFICATION REPORT

- 2<sup>ND</sup> PERIODIC -

## CERPA – CENTRAL ENERGÉTICA DO RIO PARDO LTDA

VERIFICATION OF THE CENTRAL ENERGÉTICA DO  
RIO PARDO COGENERATION PROJECT - CERPA

MONITORING PERIOD 06/2006 – 12/2006

**Report No: 4886/07-07/32 - V01**

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Client: <b>Cerpa – Central Energética do Rio Pardo Ltda</b>	Client ref.: <b>Sylvio Ortega</b>									
<p>Summary: CERPA – Central Energética do Rio Pardo Ltda has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2<sup>nd</sup> periodic verification of the project: “<i>Central Energética do Rio Pardo Cogeneration Project (CERPA)</i>”, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions by displacement of conventional generated electricity in the Brazilian interconnected grid by renewable power from a bagasse-based cogeneration plant.</p> <p>This verification covers the period from 2006-06-01 to 2006-12-31.</p> <p>A risk based approach has been followed to perform this verification. In the course of the verification no Forward Action Request (FAR) but one Corrective Action Request (CAR) <b>and one Clarification Request (CR) were</b> opened and resolved.</p> <p>The verification is based on the draft monitoring report (December 2006), the final monitoring report (<b>July 2007</b>), the monitoring plan as set out in the validated PDD, the validation report, the verification report from previous verification and supporting documents made available to the TÜV NORD JI/CDM CP by the project participants.</p> <p>As a result of this periodic verification, the verifier confirms that:</p> <ul style="list-style-type: none"> <li>• all operations of the project are implemented and installed as planned and described in the validated project design document.</li> <li>• the installed equipment essential for generating emission reductions runs reliable and is calibrated appropriately.</li> <li>• the monitoring system is in place and fully functional. The project is ready to generate GHG emission reductions.</li> </ul> <p>As the result of the 2<sup>nd</sup> periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:</p> <table> <tr> <td>Baseline emissions:</td> <td>19,379</td> <td>t CO<sub>2eq</sub></td> </tr> <tr> <td>Project emissions:</td> <td>0</td> <td>t CO<sub>2eq</sub></td> </tr> <tr> <td><b>Emission reductions:</b></td> <td><b>19,379</b></td> <td><b>t CO<sub>2eq</sub></b></td> </tr> </table>		Baseline emissions:	19,379	t CO <sub>2eq</sub>	Project emissions:	0	t CO <sub>2eq</sub>	<b>Emission reductions:</b>	<b>19,379</b>	<b>t CO<sub>2eq</sub></b>
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<b>Emission reductions:</b>	<b>19,379</b>	<b>t CO<sub>2eq</sub></b>								

Report No.: <b>4866/07-07/32-V01</b>	Subject Group: <b>Environment</b>
Report title: <b><i>Second Verification Report – CERPA – Central Energética do Rio Pardo Cogeneration Project</i></b>	
Work carried out by: <b>Rainer Winter, M. C. C. Coelho</b>	
Work verified by: <b>Wolfgang Wielpütz</b>	
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**Indexing terms**

*Climate Change, CDM, Small Hydro Power, Verification, Kyoto Protocol*

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## Abbreviations

<b>CAR</b>	<b>Corrective Action Request</b>
<b>CDM</b>	<b>Clean Development Mechanism</b>
<b>CER</b>	<b>Certified Emission Reduction</b>
<b>CETESB</b>	<b>Companhia de Tecnologia e Saneamento Ambiental (São Paulo State Environmental Agency)</b>
<b>CO<sub>2</sub></b>	<b>Carbon dioxide</b>
<b>CO<sub>2eq</sub></b>	<b>Carbon dioxide equivalent</b>
<b>CP</b>	<b>Certification Program</b>
<b>CR</b>	<b>Clarification Request</b>
<b>DAEE</b>	<b>Departamento de Águas e Energia Elétrica – SP (Water and Electric Energy Department of the State of São Paulo)</b>
<b>FAR</b>	<b>Forward Action Request</b>
<b>GHG</b>	<b>Greenhouse gas(es)</b>
<b>GWP</b>	<b>Global Warming Potential</b>
<b>kW</b>	<b>Kilowatt</b>
<b>LoA</b>	<b>Letter of Approval</b>
<b>MR</b>	<b>Monitoring Report</b>
<b>MP</b>	<b>Monitoring Plan</b>
<b>MW</b>	<b>Megawatt</b>
<b>PDD</b>	<b>Project Design Document</b>
<b>PPA</b>	<b>Power Purchase Agreement</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>
<b>VVM</b>	<b>Validation and Verification Manual</b>

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## 1. INTRODUCTION

CERPA – Central Energética do Rio Pardo Ltda has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 2<sup>nd</sup> periodic verification of the project: “Central Energética Rio Pardo Cogeneration Project (CERPA)”, with regard to the relevant requirements for CDM project activities. The verifiers have reviewed the GHG data collected for the period between 2006-06-01 and 2006-12-31.

### 1.1. Objective

The objective of the periodic verification is the review and ex post determination by an independent entity of the GHG emission reductions. It includes the verification of the data given in the monitoring report by checking the monitoring records and the emission reduction calculation.

### 1.2. Scope

The verification of this registered project is based on the validated project design document <sup>/PDD/</sup>, the monitoring report <sup>/MR2/</sup>, supporting documents handed over to the verifier and information got by performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The documents and information are reviewed against the requirements and criteria mentioned below. The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual <sup>/VVM/</sup> employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The verification is carried out on the basis of the following requirements, applicable for this project:

- Article 12 of the Kyoto Protocol <sup>/KP/</sup>,
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 17/CP.7 <sup>/MA/</sup>, and the annex II to decision 21/CP.8 and subsequent decisions made by the Executive Board,
- other relevant rules, including the host country legislation,
- monitoring plan as given in the PDD <sup>/PDD/</sup>,
- CDM Large Scale Methodology AM0015, version 1 <sup>/AM/</sup>.

### 1.3. GHG Project Description

#### 1.3.1. Project Characteristics

Essential data of the project is presented in the following Table 1-1.

The GHG project can be classified as a large-scale CDM project in the sector given in Table 1-1 (according to UNFCCC sectoral scope numbers for CDM).

**Table 1-1:** Project Characteristics

Item	Data
Project title	Central Energética do Rio Pardo Cogeneration Project (CERPA)
CDM registration No.	0209
Date of registration	2006-03-09
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	1: Energy Industries (renewable - / non-renewable sources)
Applied Methodology	AM0015, version1: "Bagasse-based cogeneration connected to an electricity grid"
Crediting period	Renewable Crediting Period (7 y)
Start of crediting period	2003-05-01
Host country	Brazil

#### 1.3.2. Project Parties

Brazil.

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### 1.3.3. Project Participants

The following project participants are involved in the project activity as per LoA:

**Project Participant:** Cerpa – Central Energética Rio Pardo Ltda  
Usina da Pedra, Zona Rural  
Serrana - São Paulo  
14150-000  
Brazil

Contact Person Mr. Sylvio Ortega  
[ortega@uspedra.com.br](mailto:ortega@uspedra.com.br)

### 1.3.4. Project Location

The project is located in Serrana, close to Ribeirão Preto, that is the main city in the northeast of the state of São Paulo (Brazil). It is located in one of the main agricultural centers of the country.

### 1.3.5. Technical Project Description

The sugar mill produces sugar and anhydrous and hydrated alcohol, as well as generates its own electricity. The project activity consists of increasing the efficiency and capacity of the bagasse cogeneration facility at Usina da Pedra.

The project activity increased the efficiency and the capacity of previous generation of energy on the basis of bagasse (a renewable fuel source, residue from sugarcane processing), using a high pressure boiler and a multiple stage backpressure turbine coupled with two new 15 MW generators. According to ANEEL Resolutions <sup>/ANEEL/</sup> the total capacity installed for Usina da Pedra is 40 MW.

The emission reductions are a result of the displacement of conventional generated energy in the Brazilian South-Southeast-Midwest grid.

## 2. VERIFICATION TEAM

- The Verification Team was led by **Mr. Rainer Winter**. Mr. Winter works at TÜV NORD CERT GmbH as ISO 9001 and ISO 14001 Auditor, as an environmental verifier for EMAS, and as a DEHSt-appointed emission verifier in the framework of the EU-ETS. Mr. Winter has been appointed as JI/CDM assessor and is in charge of the TÜV NORD JI/CDM CP. For this verification he was assisted by:
- **Maria Carolina Crisci Coelho**, BRTÜV-Brazil (TÜVNORD-Brazil), Mrs. Coelho is ISO 14001 Auditor and Product Manager for CDM Services for BRTÜV. She is an appointed expert of TÜV NORD JI/CDM certification program.

The final verification report is verified by

- **Mr. Wolfgang Wielpütz**. He is ISO 9001 and 14001 Auditor, environmental verifier for EMAS and DEHSt-appointed emission verifier in the framework of EU-ETS. He is appointed JI/CDM assessor. Mr. Wielpütz is the head of the department: "Integrated management systems, environmental and occupational safety" and deputy chief of TÜV NORD CERT GmbH.

As a trainee **Ms. Inga Nagel** took part in the verification of this project activity. She works for the TÜV NORD CERT GmbH.

## 3. METHODOLOGY

The verification of the project was carried out from January to May 2007:

Preparations: *From 2007-01-20 to 2007-02-25*

On-site verification: *2007-02-26*

Reporting: *From 2007-02-27 to 2007-05-29*

The verification consisted of the following steps:

- A desk review of the Monitoring Report<sup>/MR2/</sup> submitted by the client and additional supporting documents with the use of the customised verification protocol<sup>/CPM/</sup> according to the Validation and Verification Manual<sup>/VVM/</sup>,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Verification reporting.



### 3.1. Verification Protocol

In order to ensure transparency and consideration of all relevant assessment criteria, a verification protocol was used. The protocol shows, in a transparent manner, criteria and requirements, means and results of verification. The verification protocol serves the following purposes:

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

The applied verification protocol consists of two Periodic Verification Checklists: Table 1 (Data Management System/Controls); Table 2 (GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing) as described in figure 3-1.

The completed verification protocol is enclosed in the annex to this report.

<b>Periodic Verification Checklist</b>			
<b>Table 1: Data Management Systems/Controls</b>			
<b>Expectations for GHG data management system/controls</b>	<b>Comments</b>	<b>Draft Concl</b>	<b>Final Concl.</b>
<i>The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table.</i>	<i>Description of circumstances and further commendation to the conclusion.</i>	<i>This is either acceptable based on review of MR and supporting Documents (OK), or a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Draft Verification report. The Initial Verification has additional <b>Forward Action Requests (FAR)</b>. FAR indicates essential risks for further periodic verifications</i>	<i>CARs and CRs raised in the Draft Conclusion have to be closed or resolved. The final conclusion determines the final statement. FARs could remain in this section as they are subject in the next consecutive verification.</i>

<b>Periodic Verification Checklist</b>				
<b>Table 2: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing</b>				
<b>Identification of potential reporting risk</b>	<b>Identification, assessment and testing of management controls</b>	<b>Areas of residual risks</b>	<b>Additional verification testing performed</b>	<b>Conclusions and Areas Requiring Improvement (including Forward Action Requests)</b>
<i>The following potential risks were identified and divided and structured according to the possible areas of occurrence.</i>	<i>The potential risks of raw data generation have been identified in the course of the monitoring system implementation. The following measures were taken in order to minimize the corresponding risks.  The following measures are implemented:</i>	<i>Despite the measures implemented in order to reduce the occurrence probability the following residual risks remain and have to be addressed in the course of every verification.</i>	<i>The additional verification testing performed is described. Testing may include: - Sample cross checking of manual transfers of data - Recalculation - Spreadsheet 'walk throughs' to check links and equations - Inspection of calibration and maintenance records for key equipment - Check sampling analysis results Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.</i>	<i>Having investigated the residual risks, the conclusions should be noted here. Errors and uncertainties are highlighted.</i>

**Figure 3-1:** Verification protocol tables

### 3.2. Review of Documentation

The following documents were reviewed:

- the last revision of the PDD including the monitoring plan<sup>/PDD/</sup>,
- the last revision of the validation report<sup>/VAL/</sup>,
- the last revision of the monitoring report of previous verification<sup>/MR1/</sup>,
- the last revision of the verification report of the initial and 1<sup>st</sup> periodic verification<sup>/VER/</sup>,
- the last revision of the monitoring report, including the claimed emission reductions for the project<sup>/MR2/</sup>.

Other supporting documents, such as technical drawings, performance records, meter readings, calibration documents and business data were also reviewed.

### 3.3. On-site assessment

The assessment performed during the verification enabled the verifier to arrive at a conclusion regarding the readiness of the project to generate high quality emission reductions. As such, it was indispensable to carry out an inspection on site in order to verify that the project is implemented in accordance with the applicable criteria. Furthermore the on-site assessment is necessary to check the monitoring data with respect to accuracy to ensure the calculation of emission reductions.

- The on-site assessment included an investigation of whether all relevant equipment is installed and works as anticipated.
- The persons were interviewed and observed in order to check the risks of inappropriate operation and data collection procedures.
- Information processes for generating, aggregating and reporting the selected monitored parameters were reviewed.
- Metering equipment was checked and positions of counters were recorded in order to prepare for the next periodic verification.
- The duly calibration of metering equipment was checked.
- The monitoring processes, routines and documentations were audited to check their proper application.
- The monitoring data were checked via spot sample on the level of the meter recordings.

Before and during the on-site visit on 2007-02-26, the verifier of TÜV NORD JI/CDM CP performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

Representatives of Cerpa - Centrais Elétricas do Rio Pardo Ltda. and Ecoinvest Consult (project developer) including the operational staff of the plant were interviewed. The main topics of the interviews are summarised in Table 3-1.

**Table 3-1** Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel 2. Consultant, Ecoinvest	<ul style="list-style-type: none"> <li>- General aspects of the project</li> <li>- Project design and implementation</li> <li>- Commissioning</li> <li>- Technical equipment and operation</li> <li>- Monitoring and measurement equipment</li> <li>- Calibration procedures</li> <li>- Quality management system</li> <li>- Involved personnel and responsibilities</li> <li>- Training and practice of the operational personnel</li> <li>- Implementation of the monitoring plan</li> <li>- Monitoring data management</li> <li>- Data uncertainty and residual risks</li> </ul>

Interviewed Persons / Entities	Interview topics
	<ul style="list-style-type: none"><li>- GHG calculation</li><li>- Procedural aspects of the verification</li><li>- Maintenance</li><li>- Environmental aspects</li><li>- FAR issued on 1st periodic verification report</li></ul>

### 3.4. Resolution of Forward and Corrective Action Requests

Nonconformities raised during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

Corrective Action Requests (CARs) are issued, if:

- there is a clear deviation concerning to the above mentioned applicable criteria (esp. the monitoring plan).
- requirements set by the monitoring plan or qualifications in the validation opinion have not been met; or
- there is a risk that the project would not be able to deliver emission reductions.

Forward Action Requests (FAR) indicate essential risks for further periodic verifications. Forward Action Requests are issued, if:

- the actual status requires a special focus on this item for the next consecutive verification, or
- an adjustment of the monitoring plan is recommended.

The verification team may also use the term Clarification Request (CR), which would be issued if:

- additional information is needed to fully clarify an issue.

#### 4. VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report<sup>/MR2/</sup>, the PDD<sup>/PDD/</sup>, the verification report of the initial and 1<sup>st</sup> periodic verification<sup>/VER/</sup> and other supporting documents, as well as from the on-site assessment and the interviews are summarised.

The summary of CAR, FAR and CR issued are shown in Table 4-1:

**Table 4-1:** Summary of CAR, FAR and CR

Verification topic	No. of CAR	No. of FAR	No. of CR
Remaining issues	0	0	0
Completeness of Monitoring	1	0	0
Accuracy of emission reduction calculations	0	0	1
Quality of Evidence to Determine Emission Reductions	0	0	0
Management system and quality assurance	0	0	0
<b>SUM</b>	<b>1</b>	<b>0</b>	<b>1</b>

For an in depth evaluation of all verification items it should be referred to the verification protocols (see Annex).

## 4.1. Periodic Verification Findings

### 4.1.1. Remaining Issues from previous Verification

During the initial and 1<sup>st</sup> periodic verification four FARs were raised:

#### **Forward Action Request 1**

*“There are procedures for the operation of the energy generation system, including the Boilers, Turbines and Generators, and for the monitoring and measurement of various parameters, but they are not documented.”*

An appropriate documentation of the respective procedures has been provided to the verification team during the on-site visit (e.g. Master list of procedures <sup>/MLP/</sup>).

FAR is checked and resolved.

#### **Forward Action Request 2**

*“There were found evidences of the qualification and training of all the personnel involved in the steam and electricity generation systems. The training is performed utilizing the Operation Manuals and Technical Information of the Boilers, Turbines and Generators. There are not formal Job descriptions and definition of competences needed for the Boilers/Turbines/Generators Operators. There is not a formal Training Program.”*

Job descriptions and profiles of qualification for the operators participating in the energy generation process as well as a training schedule and records of training are presented during the on-site visit.

FAR is checked and resolved.

#### **Forward Action Request 3**

*“There are procedures used for gathering data for the emission reduction activities, including responsibilities, but they are not documented. The personnel responsible for the project management, including monitoring and measurement, have adequate knowledge of these procedures.”*

The responsibilities of all the persons related to the project activity are formalized in an organization chart, specific procedures and working instructions. Respective documents were presented to the verification team during the on-site visit. (e.g. <sup>/OC/</sup>, <sup>/QR/</sup>).

FAR is checked and resolved.

#### **Forward Action Request 4**

*“There are weekly management review meetings to discuss the Usina da Pedra Operations in general, including the Energy Generation System. These meetings are not formal but they allow the identification and solution of problems at an early stage. There were not found evidences of Internal Audits to the Energy Generation System.”*

Internal audits of the energy generation system are carried out, using a specified checklist. The proceeding is determined in a procedure<sup>/PN/</sup>. The results of the internal audits are discussed within the weekly management review meetings. Respective records of the meetings were provided to the verification team<sup>/RQ/</sup>.

FAR is checked and resolved.

#### **4.1.2. Completeness of Monitoring**

The only relevant parameter to monitor is the electricity fed into the grid. The reporting procedures reflect the requirements of the monitoring plan. All relevant data is collected continuously and stored during the whole monitoring period. The monitoring consists in using meter equipment projected to registry and verifies the energy generated by the facility. All invoices issued by CERPA during the monitoring period were checked against the confirmation of receipt of energy dispatched to the grid from CPFL.

Methodology AM0015 requires the monitoring of data required to calculate CO<sub>2</sub> emissions from fossil fuels combusted due to the project activity at the project site, where relevant. The equipment in operation to produce electricity at the project activity is not appropriate to combust fossil fuels. This was verified during the on-site visit. Moreover there were no evidences like a stockyard for fossil fuels, a natural gas connection or records of fossil fuel delivery at the project site that indicate any use of fossil fuels for combustion. Therefore it can be concluded that no emissions from the consumption of the fossil fuel have been generated in the project activity and monitoring of this data is not applicable. This issue should be addressed in subsequent verifications.

During the verification process no significant lacks of evidence were detected, only some editorial mistakes. Hence CAR1 was raised and has been corrected during the verification process.

#### **4.1.3. Accuracy of Emission Reduction Calculations**

According to the selected approved methodology (AM0015, version 1), the baseline emission factor (*EF<sub>y</sub>*) is calculated as a combined margin (*CM*), consisting of the combination of operating margin (*OM*) and build margin (*BM*) factors. Determining

the build margin and the operating margin emission factors, a project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints. The ex-ante calculated grid emission factor as per registered PDD is fixed with 0.2677 tCO<sub>2e</sub>/MWh and this is the value used in the monitoring report <sup>/MR2/</sup>.

According to the MP and the applied methodology the only parameter that has to be measured and calculated is the electricity supplied to the grid. The electricity meters used are well known and state of the art. CERPA performs the measurements in the sub-station and the collected data is transferred via remote data transmission. All measured data is collected continuously during the whole monitoring period.

Calculation of the emission reductions is based on validated and registered parameters fixed in the PDD for the Brazilian South-Southeast-Midwest interconnected grid.

However, with regard to the request for review, clause 2, CR1 was raised additionally and could be resolved.

#### **4.1.4. Quality of Evidence to Determine Emission Reductions**

The key parameter “power output” was measured by a calibrated meter. CPFL/Metrowatt Comércio e Manutenção Ltda provided the power meter and is responsible for the calibration.

The verification team got access to all relevant documentation regarding the monitoring of the emission reduction calculation, like:

- technical data of the measuring equipment,
- meter readings by CERPA,
- confirmation of receipt,
- calibration certificate,
- measurement devices stock list,
- quality management system,
- calculation spreadsheets.

All these documentation were checked and found to be consistent and of high quality. Furthermore all needed information is traceable and appropriately archived.

All used parameters were of sufficient and appropriate quality to assure an accurate monitoring.

It could be evidenced that the whole monitoring system was fully operational during the entire monitoring period.



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#### **4.1.5. Management System and Quality Assurance**

The management system for the monitoring of the CDM Project is in place. The organizational structures with the responsibilities have been properly identified. The key parameters are measured and reviewed periodically as per the procedures. The meter is calibrated by CPFL/Metrowatt.

The data of supplied energy is sent to the power utility -CPFL and checked there by competent personnel. CPFL issues a confirmation of receipt every month. Based on this information CERPA exposes the invoice.

There are weekly management review meetings to discuss operations at Usina da Pedra in general, including the energy generation system. These meetings are recorded. Internal Audits of the energy generation system are carried out, using a specified checklist.

### 4.1.6. Summary of Findings and Conclusions

The findings of the Periodic Verification process are summarized in table 4-2 below.

**Table 4-2:** Periodic Verification Findings

Topic	#					
Remaining issues		Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input checked="" type="checkbox"/> None
		Findings	-			
		Corrective Action	-			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was <b>not</b> taken <input checked="" type="checkbox"/> The project complies with the requirements			
Completeness of monitoring	CAR 1	Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	The date of the monitoring report (version 1) in section A.2. is within the monitoring period and ID number 5 in section B.3. is missing.			
		Corrective Action	Corrections have been done.			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was <b>not</b> taken <input type="checkbox"/> The project complies with the requirements			
Accuracy of emission reduction calculations	CR 1	Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input checked="" type="checkbox"/> CR	<input type="checkbox"/> None
		Findings	Clarification is required about the difference between the estimated electricity production in the PDD (45,000 – 60,000MWh/year) and the monitored value of 72,392 MWh/7 month.			
		Corrective Action	The project participants addressed the issue adequately and provided additional information in the revised monitoring report.			
		Conclusion	<input type="checkbox"/> To be checked during next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was <b>not</b> taken <input type="checkbox"/> The project complies with the requirements			



<b>Quality of evidence to determine emission reductions</b>	Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input checked="" type="checkbox"/> None
	Findings	-			
	Corrective Action	-			
	Conclusion	<input type="checkbox"/> To be checked du-ring next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was <b>not</b> taken <input checked="" type="checkbox"/> The project complies with the requirements			
<b>Management system and quality assurance</b>	Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> FAR	<input type="checkbox"/> CR	<input checked="" type="checkbox"/> None
	Findings	-			
	Corrective Action	-			
	Conclusion	<input type="checkbox"/> To be checked du-ring next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> MR was corrected correspondingly <input type="checkbox"/> Appropriate action was <b>not</b> taken <input checked="" type="checkbox"/> The project com-plies with the requirements			



**5. PROJECT SCORECARD**

Risk Areas		Conclusions			Summary of findings and comments
		Baseline Emissions	Project Emissions	Calculated Emission Reductions	
<b>Completeness</b>	<ul style="list-style-type: none"> <li>Source coverage/ boundary definition</li> </ul>	✓	✓	✓	All relevant sources are covered by the monitoring plan. The project boundaries are defined correctly and transparently.
<b>Accuracy</b>	<ul style="list-style-type: none"> <li>Physical Measurement and Analysis</li> </ul>	✓	✓	✓	Evidence is provided that the measurement of the electrical output meets the necessary accuracy requirements.
	<ul style="list-style-type: none"> <li>Data calculations</li> </ul>	✓	✓	✓	The emission reductions are calculated correctly.
	<ul style="list-style-type: none"> <li>Data management &amp; reporting</li> </ul>	✓	✓	✓	The procedures and instructions are updated.
<b>Consistency</b>	<ul style="list-style-type: none"> <li>Changes in the project</li> </ul>	✓	✓	✓	The project has been implemented as described in the PDD.

## 6. VERIFICATION STATEMENT

CERPA – Central Energética do Rio Pardo Ltda has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2<sup>nd</sup> periodic verification of the project: “*Central Energética do Rio Pardo Cogeneration Project (CERPA)*”, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions by displacement of conventional generated electricity in the Brazilian interconnected grid by renewable power from a bagasse-based cogeneration plant.

This verification covers the period from 2006-06-01 to 2006-12-31.

A risk based approach has been followed to perform this verification. In the course of the verification no Forward Action Request (FAR) but one Corrective Action Request (CAR) and one Clarification Request (CR) were raised and resolved.

The verification is based on the draft monitoring report (December 2006), the final monitoring report (July 2007), the monitoring plan as set out in the validated PDD, the validation report, the verification report from previous verification and supporting documents made available to the TÜV NORD JI/CDM CP by the project participants.

As the result of the 2<sup>nd</sup> periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Baseline emissions:	19,379	t CO <sub>2eq</sub>
Project emissions:	0	t CO <sub>2eq</sub>
<b>Emission reductions:</b>	<b>19,379</b>	<b>t CO<sub>2eq</sub></b>

Essen, 2007-07-06



Rainer Winter  
TÜV NORD JI/CDM Certification Program  
Verification Team Leader

## 7. REFERENCES

**Table 7-1:** Documents provided by the project proponent

Reference	Document
/ANEEL/	ANEEL Resolution number 608, 5 <sup>th</sup> September 2003, valid for 30 years – Giving authorization to CERPA to be an independent electrical energy producer, with installed capacity of 40 MW, with two existing 5 MW generator and two new 15 MW generators.
/CC/	Calibration certificate #007-E/MW (2006/03/21) of main meter serial number 40072296-8 – ELO 2180SP by Metrowatt Comércio e Manutenção Ltda
/CPFL/	Confirmation of receipts from CPFL and invoices of the energy sales
/DAEE/	Water Impounding Permit according to DAEE Resolution # 389, issued 2 <sup>nd</sup> April, 2002 and valid up to 2 <sup>nd</sup> April, 2007 – wells #02 and #03. Water Impounding Permit according to DAEE Resolution # 2368, issued 21 <sup>st</sup> December, 2006 and valid up to 21 <sup>st</sup> December, 2011 – well #04.
/EX/	Periodic readings of electricity exported to the grid
/JMR/	Joint Meter Readings
/MLP/	Master list of procedures – RQ-SGQ-001, ver.03, 6 <sup>th</sup> February 2007
/MR1/	Monitoring Report “Central Energética do Rio Pardo Cogeneration Project” for the period 1 <sup>st</sup> May 2003 to 31 <sup>st</sup> May 2006, ver. 02 – 5 <sup>th</sup> July, 2006
/MR2/	Monitoring Report “Central Energética do Rio Pardo Cogeneration Project” for the period 1 <sup>st</sup> June 2006 to 31 <sup>st</sup> December 2006, ver. 01 – 27 <sup>th</sup> December, 2006 Monitoring Report “Central Energética do Rio Pardo Cogeneration Project” for the period 1 <sup>st</sup> June 2006 to 31 <sup>st</sup> December 2006, ver. 02 – 04 <sup>th</sup> April, 2007 Monitoring Report “Central Energética do Rio Pardo Cogeneration Project” for the period 1 <sup>st</sup> June 2006 to 31 <sup>st</sup> December 2006, ver. 03 – 11 <sup>th</sup> May, 2007 Monitoring Report “Central Energética do Rio Pardo Cogeneration Project” for the period 1 <sup>st</sup> June 2006 to 31 <sup>st</sup> December 2006, ver. 04 – 10 <sup>th</sup> July, 2007
/NP/	Organization Chart – NP-CERPA-001 ver.01 – 5 <sup>th</sup> February 2007
/OL/	CETESB’s Operation License #4002375, issued 3 <sup>rd</sup> May 2006, valid until 3 <sup>rd</sup> May 2011
/PDD/	Final Project Design Document for CDM project “Central Energética do Rio

Reference	Document
	Pardo Cogeneration Project”, registered March 2006
/PN/	Procedure Norm – NP-CERPA-001, rev.01, 5 <sup>th</sup> February 2007
/PO/	Operation Procedure – PO-CERPA-007, ver.01, 5 <sup>th</sup> February 2007
/PPA/	Power Purchase Agreement (2002/01/07)
/QR/	Quality Register – RQ-CERPA-DRH-002, ver.01, 2 <sup>nd</sup> January 2007
/RQ/	Meeting acts/reports of technician - RQ-SGS-028, dt. 2006/07/07, 2006/08/25, 2006/09/22, 2006/10/06, 2006/01/12
<b>/USDA/</b>	Special article: “Ethanol Demand Driving the Expansion of Brazil’s Sugar Industry”; by Constanza Valdes, 2007, Economic Research Service, USDA <a href="http://www.ers.usda.gov/Briefing/Sugar/sugarpdf/EthanolDemandSSS249.pdf">http://www.ers.usda.gov/Briefing/Sugar/sugarpdf/EthanolDemandSSS249.pdf</a>
/VAL/	Validation Report – “Central Energética do Rio Pardo Cogeneration Project (CERPA) in Brazil”, ver.02, 23 <sup>rd</sup> December, 2005, issued by DNV Det Norske Veritas
/VER/	Verification Report “Central Energética do Rio Pardo Cogeneration Project”, ver.01, 3 <sup>rd</sup> August, 2006, issued by BVQI Bureau Veritas Quality International

**Table 7-2:** Background investigation and assessment documents

Reference	Document
/AM /	AM0015, version 1: “Bagasse-based cogeneration connected to an electricity grid”
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/KP/	Kyoto Protocol (1997)
/MA/	Decision 17/CP.7 (Marrakech Accords): Guidelines for the implementation of Article 12 of the Kyoto Protocol
/VVM/	IETA, PCF Validation and Verification Manual (V. 4)

**Table 7-3:** List of interviewed persons

Reference		Name	Organisation / Function
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	E. O.Brondi	Cerpa, Analyst
/IM01/	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	K. M. Nagai	Ecoinvest, Consultant
/IM01/	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	V. L. A. Fidelis	Cerpa, Human Development Assistant
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	W. Montanari	Cerpa, Human Development Coordinator
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	A. Branco Júnior	Cerpa, Utilities, Energy, Instrumentation and Automation Manager
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	N. A. S. Durão	Cerpa, Industrial Manager



# ANNEX



**ANNEX: VERIFICATION PROTOCOL**

**Table 1: Data Management System/Controls**

Expectations for GHG data management system/controls	Verifiers Comments	Draft Concl.	Final Concl.
<b>1. Defined organisational structure, responsibilities and competencies</b>			
<b>1.1. Position and roles</b> <i>Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.</i>	The Industrial Director is responsible for the project. He is supported by the Industrial Manager, the Utilities, Energy, Instrumentation and Automation Manager, the person responsible for electric maintenance and energy generation and the person in charge of vapor generation as per mentioned in the organization chart.	OK	OK
<b>1.2. Responsibilities</b> <i>Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.</i>	The responsibilities of all the persons related to the project activity are formalized in an organization chart, specific procedures and working instructions. Respective documents were presented to the verification team during the on-site visit.	OK	OK
<b>1.3. Competencies needed</b> <i>Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.</i>	Competencies needed for each aspect of the GHG determination process are formally defined and training procedures for the monitoring personnel has been documented. Training records have been submitted to the verification team.	OK	OK





Expectations for GHG data management system/controls	Verifiers Comments	Draft Concl.	Final Concl.
<b>3. Application of GHG determination methods</b>			
<p><b>3.1. Methods used</b> <i>There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.</i></p>	<p>The GHG emission reductions have been determined acc. to the Methodology AM0015, version 1 – “Bagasse-based cogeneration connected to an electricity grid” and the monitoring plan as set out in the registered PDD. The energy supplied to the grid is recorded by reading of the meter located at the sugar mill’s substation. In case of failure of the main meter, the measurement will be done by the backup meter. The electricity exported to the grid is multiplied with the predetermined carbon emission factor (as per registered PDD) to result in the actual emission reductions. During the on-site visit all relevant procedures according to the management and monitoring for the determination of the emission reductions of the CDM project were implemented and available. However, with regard to the request for review, clause 2, the following CR has been raised and could be resolved: Clarification is required about the difference between the estimated electricity production in the PDD (45,000 – 60,000MWh/year) and the monitored value of 72,392 MWh/7 months.</p>	<p>CR-1</p>	<p>OK</p>
<p><b>3.2. Information/process flow</b> <i>An information/process flow diagram, describing the entire process from raw data to reported totals is developed.</i></p>	<p>The total energy generated by the mill and its distribution to the power utility-CPFL is given in monthly tables. The procedure for recording the power exported to the grid has been indicated in the Power Purchase Agreement. The monitoring report includes the monitoring of the power supplied to the grid, the utilized emission factor</p>	<p>OK</p>	<p>OK</p>



Expectations for GHG data management system/controls	Verifiers Comments	Draft Concl.	Final Concl.
	<p>and the calculation of the emissions reductions.</p> <p>There is an internal control system installed, using a back-up meter system of the electricity exported to the grid. A daily control is done by comparing the data of the back-up meter system with the main meter readings, as well as a manual registration of the data of the main meter. The internal data and the values invoiced are compared.</p>		
<p><b>3.3. Data transfer</b>  <i>Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.</i></p>	<p>The procedure for recording the power exported to the grid has been indicated in the Power Purchase Agreement.</p> <p>From 1<sup>st</sup> June, 2006 to 31<sup>st</sup> December, 2006, the measurements of the energy exported to the grid were done by means of ELO 2180SP meter of the power utility-CPFL.</p> <p>The data of supplied energy is sent to the power utility - CPFL and checked there by competent personnel. CPFL issues a confirmation of receipt every month. Based on this information CERPA exposes the invoice.</p> <p>The emission reductions are calculated using the checked data.</p>	OK	OK
<p><b>3.4. Data trails</b>  <i>Requirements for documented data trails are defined and implemented and all documentation are physically available.</i></p>	<p>The requirements for documented data traceability are fulfilled and tested on a random sample basis during the site visit.</p>	OK	OK

Expectations for GHG data management system/controls	Verifiers Comments	Draft Concl.	Final Concl.
<b>4. Identification and maintenance of key process parameters</b>			
<b>4.1. Identification of key parameters</b> <i>The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.</i>	The key parameter with significant influence on the calculation of emission reductions is the power output. This parameter was measured with high accuracy by calibrated meters.	OK	OK
<b>4.2. Calibration/maintenance</b> <i>Appropriate calibration/maintenance requirements are determined.</i>	The uploading station meter is calibrated by Metrowatt Comércio e Manutenção Ltda. Corresponding evidence was provided by the Calibration Certificate #007-E/MW (2006/03/21). According to clause 10, chapter VI of the PPA, the local power utility-CPFL is responsible for the continuous monitoring of the performance of the meter and for the calibration of the meter at least once every 12 months.	OK	OK
<b>5. GHG Calculations</b>			
<b>5.1. Use of estimates and default data</b> <i>Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.</i>	The key parameter power output was measured. The emission factor was fixed ex-ante at the real stage, according to AM0015, version 1.	OK	OK
<b>5.2. Guidance on checks and reviews</b> <i>Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person</i>	An internal auditing procedure is in place. The project personnel are aware about the accuracy requirements for the data. Moreover a comparison of both metering systems (main	OK	OK



Expectations for GHG data management system/controls	Verifiers Comments	Draft Concl.	Final Concl.
<p><i>not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.</i></p>	<p>and backup meter) was carried out in order to determine the accuracy, consistency and correctness of the measured values. See also comment 3.3.</p>		
<p><b>5.3. Internal validation and verification</b>  <i>Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.</i></p> <p><i>Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.</i></p>	<p>The internal verification is accomplished at the plant manager level. Adequate evidences were provided to the verification team.</p>	OK	OK
<p><b>5.4. Data protection measures</b>  <i>Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).</i></p>	<p>The key parameters are being measured and recorded in the respective documents/ registers in electronic and in paper form. All software solutions are protected with standard PC protection measures and work within the limitation of user authorisation.</p>	OK	OK
<p><b>5.5. IT systems</b>  <i>IT systems used for GHG monitoring and reporting should be tested and documented.</i></p>	<p>The IT system is based on standard PC solutions. All calculations necessary for purpose of emission reduction monitoring can be done on the basis of MS – Excel (or comparable solutions). See comment 5.4.</p>	OK	OK



**Periodic Verification Checklist Table 2: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing**

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<b>Raw data generation</b>				
<ul style="list-style-type: none"> <li>• Installation of measuring equipment</li> <li>• Dysfunction of installed equipment</li> <li>• Maloperation by operational personnel</li> <li>• Downtimes of equipment</li> <li>• Exchange of equipment</li> <li>• Capacity additions</li> <li>• Change of technology</li> </ul>	<ul style="list-style-type: none"> <li>• Installation of modern and state of the art equipment</li> <li>• On line meter readings / independent counter-checks</li> <li>• Regular visual inspections of installed equipment</li> <li>• Only skilled and trained personnel operates the relevant equipment</li> <li>• Immediate exchange of dysfunctional equipment</li> <li>• Stand-by duty is organized</li> <li>• Training</li> <li>• Internal counterchecks</li> </ul>	<ul style="list-style-type: none"> <li>• Capacity additions</li> <li>• Inadequate installation / operation of the monitoring equipment.</li> <li>• Inadequate exchange of equipment.</li> <li>• Change of personnel</li> <li>• Undetected measurement errors</li> </ul>	<ul style="list-style-type: none"> <li>• Check of equipment</li> <li>• Check of technical data sheets</li> <li>• Site – visit</li> <li>• Counter-check of meter readings and commercial data</li> </ul>	<ul style="list-style-type: none"> <li>• <b>OK</b></li> </ul>





Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<b>Raw data collection</b>				
<ul style="list-style-type: none"> <li>• Metering records</li> <li>• Operational log sheets</li> <li>• Calibration and maintenance data</li> <li>• Accuracies</li> <li>• Manuals and other manufacturer data</li> <li>• Accounting records</li> </ul>	<ul style="list-style-type: none"> <li>• Exclusive installation and operation of duly calibrated equipment</li> <li>• Cross-check of data</li> <li>• Redundant manual meter readings</li> <li>• Appropriate archiving system</li> <li>• Appointment of competent external measurement institutes for calibration holding the corresponding accreditations</li> <li>• International as well as national calibration standards</li> <li>• Clear allocation of responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>• Unintended usage of old data that has been revised</li> <li>• Incomplete documentation</li> <li>• Ex-post corrections of accounting records</li> <li>• Ambiguous sources of information</li> </ul>	<ul style="list-style-type: none"> <li>• Check of calibration records</li> <li>• Check of individual (raw data) figures</li> </ul>	<ul style="list-style-type: none"> <li>• <b>OK</b></li> </ul>



Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<b>Data aggregation</b>				
<ul style="list-style-type: none"> <li>• IT Systems</li> <li>• Spread sheet programming</li> <li>• Manual data transmission</li> <li>• Data protection</li> <li>• Responsibilities</li> </ul>	<ul style="list-style-type: none"> <li>• Clear allocation of responsibilities</li> <li>• Usage of standard software solutions (Spreadsheets)</li> <li>• Limited access to IT systems</li> <li>• Data protection procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Manual data transfer mistakes</li> <li>• Unintended change of spread sheet programming or data base entries</li> <li>• Problems caused by updating/upgrading or change of applied software</li> </ul>	<ul style="list-style-type: none"> <li>• Check of data aggregation</li> <li>• Counter-calculation</li> </ul>	<ul style="list-style-type: none"> <li>• <b>OK</b></li> </ul>
<b>Other calculation parameters</b>				
<ul style="list-style-type: none"> <li>• Data sources</li> <li>• Emission factors</li> <li>• Accuracies</li> </ul>	<ul style="list-style-type: none"> <li>• Ex ante calculation of base line</li> <li>• All used values and data sources applied are defined in the monitoring plan.</li> </ul>	<ul style="list-style-type: none"> <li>• No significant residual risks</li> </ul>	<ul style="list-style-type: none"> <li>• No significant uncertainties or errors regarding the other calculation parameters were observed in the course of this verification.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>OK</b></li> </ul>



Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing performed	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i> )
<b>Calculation Methods</b>				
<ul style="list-style-type: none"> <li>• Calculation approach</li> <li>• Applied formulae</li> <li>• Lack of clarity in the monitoring plan</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate IT and archiving system</li> <li>• Usage tested Excel spreadsheets</li> </ul>	<ul style="list-style-type: none"> <li>• The danger of miscalculation can only be minimized.</li> </ul>	Countercheck on the basis of own calculation.	<ul style="list-style-type: none"> <li>• <b>OK</b></li> </ul>
<b>Monitoring reporting</b>				
<ul style="list-style-type: none"> <li>• Data transfer to the author of the monitoring report</li> <li>• Issuance of the monitoring report</li> </ul>	<ul style="list-style-type: none"> <li>• An experienced consultant is responsible for monitoring reporting</li> </ul>	<ul style="list-style-type: none"> <li>• The danger of data transfer mistakes can only be minimized</li> </ul>	<ul style="list-style-type: none"> <li>• Counter check with evidence provided.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>OK</b></li> </ul>