Voluntary Carbon Standard Version 2007.1 Verification Report

19 November 2007

Verification Report: BRAZIL/04865/2009 – Version 02

Name of Verification company:	Date of the issue:
Bureau Veritas Certification Holding SAS	December 8th, 2009
Report Title:	**Approved by:**
UHE Mascarenhas power upgrading project	Antonio Daraya – Internal Technical Reviewer
Client:	**Project Title:**
Instituto EDP Energias do Brasil	UHE Mascarenhas power upgrading project
Summary:	

Instituto EDP Energias do Brasil – a social institute under the EDP Group – has contracted Bureau Veritas Certification to carry out the verification of the project "UHE Mascarenhas power upgrading project". The monitoring period verified is 29th Jan. 2008 – 25th May 2008. This verification has been carried out following the guidelines and requirements set out by the VCS 2007.1 Standard. ENERGEST S.A., the project proponent, is controlled by the holding company EDP Energias do Brasil – which is part of the EDP Group – and will be donating its carbon credits to Instituto EDP Energias do Brasil.

UHE Mascarenhas hydro power plant uses the renewable hydro potential of the Doce River to supply electricity to a distribution system (Brazilian South-Southeast-Midwest interconnected grid) and has an installed capacity of 180.5 MW (above the eligibility limit of 15 MW for small scale projects). The methodology used in the project is UNFCCC CDM ACM0002 Version 6.

This project was earlier validated by SGS Climate Change Programme (CDM.Val0571 Revision number 01a, dated 31st Mar. 2008) and project activity was registered under the CDM on 26th May 2008, according to CDM's registered project activities database (Project 1232: UHE Mascarenhas power upgrading project). Project participant is now requesting VCS validation aiming at granting credits for the following pre-CDM period: 29th Jan. 2008 to 25th May 2008.

This project is also registered under BRTÜV/TÜV-Nord's Q27 Standard Program, with an overlap between the second monitoring period pre-CDM verified by BRTÜV and the one for which pre-CDM VCUs will be claimed. As a result, a renouncement letter has been issued by BRTÜV, stating the relevant credits pertaining to this overlap have not been used and have been cancelled. BRTÜV's first verification period is from 1st Sep. 2006 to 30th Jun. 2007 (Report No: 5263/07m-V01) and its second verification period is from 1st Jul. 2007 to 25th May 2008 (Report No: 5791/MASCARENHAS).

In accordance to VCS 2007.1 Standard and VCS Policy Announcement of 19 March 2008 – Further Guidance for Projects that are Registered in Two GHG Programs – a supplementary validation was carried out only for clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS Project Description template. This validation was conducted by Bureau Veritas (Validation Report nr. 04864/2009-SPL, dated 19th Nov. 2009).

As a result of the validation assessment of the VCS PD, supporting documents and background investigation, the validation team confirms that the project follows the VCS 2007.1 Standard and meets all the criteria and requirements of VCS 2007.1.

The first output of the verification process is a list of Clarification Requests and Corrective Actions Requests (CL and CAR), presented in Appendix A.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in project design documents. Installed equipment, essential for generating emission reduction, runs reliably and is calibrated appropriately. The monitoring system is in place and the project is already generating GHG emission reductions. The GHG emission reduction is calculated without material misstatements.

Based on the information we have seen and evaluated, we confirm the following statement: *Reporting period: From 29th Jan. 2008 to 25th May 2008.* *Project emissions : 0 t CO2 equivalents* *Baseline emissions : 29,903 t CO2 equivalents* *Emission Reductions : 29,903 t CO2 equivalents*

Work carried out by:	Number of pages:
Marco F. Prauchner – Lead GHG Verifier Marcelo A. Porto – GHG Verifier Antonio Daraya– Internal Technical Reviewer	*33*

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1. Introduction

1.1 Objective

Verification is the periodic independent review and ex post determination by the DOE of the monitored GHG emission reductions during defined verification period.

This verification has been carried out in accordance with the requirements of the VCS Program. However, as the project is a registered CDM project activity, the present verification report and the VCS validation report should always be assessed together with all CDM project documentation.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the project design document, the project's baseline study, monitoring plan and other relevant documents. The information in these documents is reviewed against VCS Program requirements.

The verification is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

1.3 VCS project Description

The project activity is a grid-connected electricity generation from a renewable source.

It is a capacity addition of installed power of 49.5 MW – a 4th generation set (Kaplan turbine and GE generator) – to the existing 131 MW hydro power plant UHE Mascarenhas, located on the Rio Doce river, in the state of Espírito Santo, Brazil.

There is no change in the level of the reservoir and the project activity is expected to generate 192,720 MWh/year and an average of emissions reduction of 50,466 tCO2e/year, according to the registered CDM PDD.

Approved CDM methodology ACM0002 Version 06 was applied in order to design the projet activity.

The 4th generation set has already been installed and is operating since 2006, having been released by the Brazilian Electricity Regulatory Agency (ANEEL) for testing operation as of 23rd Sep. 2006 and for commercial operation as of 3rd Oct. 2006, as per the following documents:
http://www.aneel.gov.br/cedoc/dsp20062192.pdf
http://www.aneel.gov.br/cedoc/dsp20062281.pdf

1.4 Level of assurance

The project has been validated by BVC for the VCS 2007.1 Standard as well as by SGS as part of the CDM registration procedure. This means that a prior assessment of the project has been carried out following the VCS 2007.1 and the CDM criteria.

The supplementary validation of VCS Project Description Template clauses 1.12, 1.13, 1.14, 8.1 and 8.2 has been carried out by BVC assessing the VCS PD, the CDM PDD, and project proponent's and third parties' documents, as described in item 3.1 of VCS validation report.

Based on the process and procedures conducted, the GHG assertion is materially correct, being a fair representation of GHG data and information, and is prepared in accordance with the related VCS 2007.1 criteria.

2. Methodology

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a verification protocol was customized for the project, according to the version 01 of the Clean Development Mechanism Validation and Verification Manual, issued by the Executive Board at its 44 meeting on 28th Nov. 2008. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- *It organizes, details and clarifies the requirements the VCS project is expected to meet;*
- *It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.*

The completed verification protocol is enclosed in Appendix A of this report.

2.1 Review of Documents:

The Monitoring Report (MR) submitted by ENERGEST S/A and additional background documents related to the project design and baseline, i.e. country Law, CDM Project Design Document (PDD), VCS PD, Approved methodology, Clarifications on Verification Requirements to be Checked by a Designated Operational Entity were reviewed.

The verification findings presented in this report relate to the project as described on the VCS PD_Mascarenhas v1, on the VCS MR_Mascarenhas v1 and on the calculation sheets VCS Monitoring 2008 – Mascarenhas v1.

2.2 Follow-up Interviews and site visit:

Follow up interviews have been carried out as follows:
- *Marcos Xavier – Operations and Maintenance Supervisor*
- *Nazareno Bragança da Silva – Operator*
- *Marco Antonio Bortolin – Operator*
- *Bruno Gonçalves de Souza – Operational Manager for Maintenance Services*
- *Ivana Fontanive Capanema – Market Studies Manager*
- *Adriano Mengol Bromochenkel – Market Studies Analyst*
- *Ida Luiza Tres Valentim – Energy Acquisition Analyst*
- *Adriana Berti – Project Developer, from CantorCO2e*

2.3 Resolution of Clarification, Corrective and Forward Action Requests:

The objective of this phase of the verification is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the GHG emission reduction calculation.

Findings established during the initial 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 (CAR) are issued, where:

(a) Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;

(b) Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;

(c) Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

Forward Action Requests (FAR) are issued, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

The verification team may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

3. Verification Findings

3.1 Remaining issues, including any material discrepancy, from previous validation

No remaining issues from previous validation have remained. All issues have been adequately answered and accepted.

3.2 Project Implementation

The project activity is operated as defined in the CDM PDD and there is no change in the major equipments. See for more details the registered CDM PDD: http://cdm.unfccc.int/UserManagement/FileStorage/BZOQW40ZUPJ33E5VCZS3QAQ0L9YL0O

3.3 Completeness of Monitoring

Monitoring has been carried out in accordance with the monitoring plan contained in the registered CDM PDD.

The parameters required by the monitoring plan and the way the Verification Team has verified the values in the monitoring reports are described below:

The only parameter to be monitored, according to the applicable approved monitoring methodology, ACM0002 Version

6, is EGy, the electricity delivered to the grid by the project activity.

These values of the monitoring report – provided buy project participant – have been verified, crosscheking 100% of them against the Brazilian Chamber of Commercialization of Electric Energy, through their Sinercom system.

3.4 Accuracy of Emission Reduction Calculations

All the necessary data and all the parameters foreseen to be monitored in the registered CDM PDD were available to the DOE. The only variable that needs to be monitored is the generated electricity delivered to the grid that is monitored by the project participant and has been 100% crosschecked against official data.

Discrepancies found during verification, regarding energy data and calculations using the wrong emission factor – as noted in the verification protocol – have been fully and satisfactorily addressed by project proponent, such that relevant CARs and CLs have been closed.

3.5 Quality of Evidence to Determine Emission Reductions

As the only variable that needs to be monitored is the generated electricity delivered to the grid and, as mentioned above, it has been 100% crosschecked against official – and reliable – data, with all relvant CARs and CLs closed, evidence to determine emission reductions is of sufficiente quantity and appropriate quality

3.6 Management and Operational System

The responsibilities and authorities for monitoring and reporting were found to be in accordance with the responsibilities and authorities stated in the monitoring plan.

4. Verification conclusion

Bureau Veritas Certification has performed a verification of the UHE Mascarenhas power upgrading project. The verification was performed based on the methodology UNFCCC – CDM – ACM0002 Version 06 and on the basis of the VCS Program criteria for projects registered under two different GHG Programs.

The verification consisted of the following phases: i) desk review of the project design and the baseline and monitoring plan and ii)resolution of outstanding issues and the issuance of the final verification report and opinion.

Bureau Veritas Certification verified the initial Project Monitoring Report for the reporting period as indicated below as well as the new corrected version of it and the attached calculation sheets. Bureau Veritas Certification confirms that the project is implemented and described in validated and registered CDM PDD and VCS PD. Installed equipment, essential for generating emission reduction, runs reliably and is calibrated appropriately. The monitoring system is in place and the project is already generating GHG emission reductions.

Bureau Veritas Certification states that the reported GHG emission reductions is complete, comparable, accurate and correct.

Reporting period: From 29/01/2008 to 25/05/2008.
Verified emission in the above reporting period:

Project emissions : 0 t CO2 equivalents
Baseline emissions : 29,903 t CO2 equivalents
Emission Reductions : 29,903 t CO2 equivalents

São Paulo, December 8th 2009

Marco Prauchner
Validation Team Leader

Antonio Daraya
Internal Technical Reviewer

5. References

The following documentation provided by Project participants was assessed:

- *Version I of VCS PD, Monitoring Report and calculation sheets;*

- *Version II of VCS PD, Monitoring Report and calculation sheets;*

- *Version III of Monitoring Report;*

- *Responses to VCS Verification Protocol;*

- *Maintenance, calibration, commercialization and measuring devices records: gross and net generation maintenance occurrence records, INMETRO's and devices manufacturer calibration certificates, CELPA_CCEAR_EnergiaNova, CCEE's gross and net energy devices records, flowchart of measuring and invoicing of sold energy, diagram of calibration standards, reports on interlab comparison programs, SCDE screen and Escelsa's calibration and inspection records of gross and net kWh-meters;*

- *BRTÜV Letter on Q-27 VERs Withdrawal; and*

- *BRTÜV's verification reports (5263/07m-V01 and 5791/MASCARENHAS).*

The following documentation was utilized during the verification procedure:

- *VCS PD Template – November 19th, 2007;*

- *VCS Verification Report Template – November 19th, 2007;*

- *CDM PDD – UHE Mascarenhas power upgrading project – Large Scale Scale CDM Project nr. 1232.*

- *SGS CDM Validation Report – CDM.Val0571 Revision number 01a, dated 31st Mar. 2008*

- *BVC VCS Validation Report – 04864/2009-SPL;*

- *Voluntary Carbon Standard 2007.1, November 18th 2008;*

- *Voluntary Carbon Standard Program Guidelines, November 18th 2008; and*

- *Clean Development Mechanism – Validation and Verification Manual, EB 44.*

6 Verifiers CV's

Marco F. Prauchner *(Lead GHG Verifier) – is graduated in Mechanical Engineering with experience in Quality and Environmental management in mechanical, plastic and chemical industries. He is ISO 9001:2000 and ISO 14001:2004 Lead Auditor and has also experience in the implementation of Environmental Management Systems. Marco is qualified as Lead Verifier and Internal technical reviewer to the GHG – Green House Gases.*

Marcelo A. Porto *(GHG Verifier) – is graduated in Electrical Engineering, with a graduate specialization in Quality Engineering and a Master's degree in Industrial Engineering. Quality management expert and auditor – he worked in the electro-electronic, mechanical, medical devices, leather and shoes industries –, trained as a lead auditor in the fields of quality (ISO 9001), environment (ISO 14001), social responsibility (SA 8000), and organizational health and safety (OHSAS 18001).*

Antonio Daraya *(Internal Technical Reviewer) – is graduated in Chemical Engineering with a very large experience in Industrial and Environmental management in several industrial fields. He is ISO 9001:2000, ISO 14001:2004 and OHSAS 18001 Lead Auditor and has also experience in the implementation of Quality and Environmental Management Systems. Antonio is qualified as Lead Verifier GHG – Green House Gases.*

Appendix A - Verification Protocol

TABLE 1 VERIFICATION REQUIREMENTS BASED ON THE VALIDATION AND VERIFICATION MANUAL (EB44 ANNEX 3)

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
1. Project implementation in accordance with the registered project design document					
It is assessed if the CDM project activity has been implemented and operated as per the registered PDD[1]	**VVM**	**187**			
a. Are all physical features of the proposed CDM project activity, proposed in the registered PDD, in place?	VVM	188	Yes.	Ok	Ok
b. Have the project participants operated the proposed CDM project activity as per the registered PDD?	VVM	188	Yes.	Ok	Ok
c. Is the proposed CDM project implemented against the description in the PDD?	VVM	188	**CAR1**: many parts of the MR v01 (e.g., under sections A.2 and B.3) are written as if the implementation and start of operation and monitoring of the 4th generation set had not occurred yet. **CAR2**: MR v01, A.3, does not present information regarding the implementation, operation and monitoring of the 4th generation set. **CL1**: Last paragraph of MR v01, A.2, is not clear.	**CAR1** **CAR2** **CL1**	Ok Ok Ok
d. Was an on-site visit conducted?	VVM	188	Yes. On October 27th and 28th 2009.	Ok	Ok
e. If not, justify the rationale of the decision.	VVM	188	N/A	Ok	Ok

[1] This Q is 'Requirement to be vrified'in VVM.

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
2. Compliance of the monitoring plan with the monitoring methodology					
It Is assessed if the monitoring plan of the proposed CDM project activity is in accordance with the applied methodology	**VVM**	**190**			
a. Is the validated monitoring plan in accordance with the approved methodology applied by the proposed CDM project activity?	VVM	191	Yes. EG_y will be monitored, as per ACM0002 Version 06.	Ok	Ok
b. If no, was a request for revision of the monitoring plan was done? (The DOE may request for revision of the monitoring plan covering the monitoring period under verification, for approval by the Board)	VVM	192	N/A	Ok	Ok
c. Are there any monitoring aspects of the project activity that are not specified in the methodology, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency)?	VVM	193	No.	Ok	Ok
3. Compliance of monitoring with the monitoring plan					
It is assessed if monitoring of reductions in GHG emissions to result from the proposed CDM project activity is implemented in accordance with the monitoring plan contained in the registered PDD or the accepted revised monitoring plan[1].	**VVM**	**195**			

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a. Have the monitoring plan and the applied methodology been properly implemented and followed by the project participants?	VVM	196	**CAR3**: Table 1, under MR v01, B.3, presents EG_y, EF_y, EF_OM_y and EF_BM_y as *Parameters monitored used to determine the monitoring period's emission reductions*. That would be applicable for *ex-post* calculations. However, according to PDD, B.6.1, the project proponent has chosen *ex-ante*: *The emission reduction ER_y by the project activity during a given year y will be calculated ex-ante […].* And as per ACM0002 Version 06, *The choice […] cannot be changed during the crediting period.* Additionally, PDD, B.7.1, states that only EG_y will be monitored. Therefore, the emission factor EF_{2008} to be used is 0.262, as per PDD, B.6.3. **CAR4**: Registered CDM PDD, B.6.1, does not justify why Dispatch Data Analysis has not been chosen to calculate the Operating Margin emission factor(s) ($EF_{OM,y}$). Simple Adjusted OM method was used, whereas *Dispatch data analysis should be the first methodological choice*, according to ACM0002 Version 06.	**CAR3** **CAR4**	Ok Ok
b. Have all parameters stated in the monitoring plan, the applied methodology and relevant CDM Executive Board decisions been sufficiently monitored and updated as applicable, including:	VVM	196	Yes.	Ok	Ok
i. Project emission parameters?	VVM	196	There is no GHG emission resulting from project activity.	Ok	Ok
ii. Baseline emission parameters?	VVM	196	Yes.	Ok	Ok
iii. Leakage parameters?	VVM	196	There is no leakage resulting from project activity.	Ok	Ok
iv. Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?	VVM	196	**CAR5**: Table 1, under MR v01, B.3, for parameter EG_y, establishes measurement *by the project developer*. This is consistent with the PDD, where project developer and proponent are the same, but not in accordance with VCS PD dated 6th Oct. 2009, Clause 1.15, that mentions CantorCO2e Brasil as project developer and ENERGEST S.A. as project proponent.	**CAR5**	Ok

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
c. Is the accuracy of equipment used for monitoring in accordance with the relevant guidance provided by the CDM Executive Board and are equipment controlled and calibrated in accordance with the monitoring plan?	VVM	196	**CAR6**: Escelsa's calibration reports of the 4th generation set kWh-meters, dated 19th Jun. 2009, present *Power* as meter manufacturer and *7550* as type of meter, not in accordance with the Brazilian Electric Power Commercialization Chamber – CCEE's meters information records, dated 13th Nov. 2009 (Net Energy) and 16th Nov. 2009 (Gross Energy), where *Schneider* is shown as manufacturer and *ION7500-4Q* as the model. **CAR7**: As per Escelsa's calibration reports of the 4th generation set kWh-meters, dated 19th Jun. 2009 and 9th Jul. 2006, the calibration standard used (serial number 21.332) had not been calibrated within the 12-month frequency, established by the Brazilian Operator of the Electric System – ONS – (Grid Procedures – Submodule 12.5, Item 6.1.1): - Meters calibration on 19th Jun. 2009: calibration standard was last calibrated on 27th Aug. 2007 (certificate number 077/2007); - Meters calibration on 9th Jul. 2006: calibration standard had been last calibrated on 21st Nov. 2001 (certificate number 0370).	**CAR6** **CAR7**	Ok Ok
i. Are monitoring results consistently reccorded as per approved frequency?	VVM	196	Yes.	Ok	Ok

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
ii. Have quality assurance and quality control procedures been applied in accordance with the monitoring plan?	VVM	196	**CAR8**: The following discrepancies have been found on the identification of the seals relevant to the 4th generation set kWh-meters, compared to the Inspection Reports dated 19th Jun. 2009: 1) Measurement panel's front door: BX06362-7 (verified) against BX22464-8 (Main – Gross Energy) and BX22524-5 (Net Energy – Main and Backup) in the reports; 2) Measurement panel's rear door: BX22808-1 (verified) against no information in the reports; 3) Calibration key of Main – Gross Energy: BX22522-3 (verified) against BX22522-2 in the report. **CL2**: Please explain the existence of two different identifications of the seal of the measurement panel's front door – BX22464-8 (Main – Gross Energy kWh-meter) and BX22524-5 (Net Energy – Main and Backup kWh-meters) –, since it is a single panel and both inspection reports – where such IDs are recorded – are dated 19th Jun. 2009. **CL3**: Please explain why the calibration key of the Net Energy – Backup kWh-meter, according to the inspection report dated 19th Jun. 2009, has been left unsealed, since the report shows it was found sealed.	**CAR8** **CL2** **CL3**	Ok Ok Ok
4. Assessment of data and calculation of greenhouse gas emission reductions					
It is assessed if GHG emission reductions achieved by / resulting from the proposed CDM project activity are calculated applying the selected methodology	VVM	198			

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
a. Is a complete set of data for the specified monitoring period is available? (If no, i.e., only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall opt to either make the most conservative assumption theoretically possible in finalizing the verification report, or raise a request for deviation if appropriate).	VVM	199	Yes. Values of EG_y, for the specified monitoring period, are available. However, the following discrepancies exist regarding the specification of the monitoring period: **CAR9**: Monitoring period relevant to MR v01 is shown incorrectly: 1) The expression *between 29th January 2008 and 25th May 2008*, under Section A.3, may lead to a misunderstanding regarding the inclusion or not of the days in the period limits. Please use an unequivocal expression and keep it along the entire MR. 2) Section B.3, on p.6, states an undefined monitoring period: *from XX January to 25th May 2008*. 3) Tables 2, 3, 4 and 8, under Section B.3, do not include the first 24 days of May 2008. 4) Table 5, under Section B.3, presents an incorrect start date (*29/January/07*). 5) Section B.4, in the first Data/Parameter table mentions *during 29th January 2008 and 25th May 2008*. 6) Table 7, under Section B.5, does not specify the days in January/2008. 7) Calculation sheets (VCS Monitoring 2008 - Mascarenhas v1.xls) attached to the VCS PD dated 6th Oct. 2009 present four tables with incorrect monitoring period in May/2008 (see *Updated Calculation version 2* and *Validation Info* sheets).	**CAR9**	Ok

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
b. Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?	VVM	199	Yes. 100% of EG_y values, for the specified monitoring period, have been cross-checked against official data: CCEE's database, through their Sinercom information system. However, the following issues have been found: **CAR10**: The total amount of electricity supplied to the grid by the project (EG_y) during the monitoring period mentioned in the MR v01, is 114,193.305 MWh. This is 75,020 MWh less than the amount shown in the calculation sheets (VCS Monitoring 2008 - Mascarenhas v1.xls) attached to the VCS PD dated 6th Oct. 2009, which is 114,268.325 MWh. This discrepancy is due to the following: 1) Two hourly measures immediately prior to the first day of the monitoring period (38,661 MWh + 35,122 MWh) have been added; 2) Three hourly measures immediately prior to May 24th 2008 (45,213 MWh + 40,045 MWh + 39,897 MWh) have been double counted; and 3) The last three hourly measures of May 25th 2008 have not been added (41,364 MWh + 41,308 MWh + 41,246 MWh). Additionally, *Validation Info* sheet, in the calculation sheets (VCS Monitoring 2008 - Mascarenhas v1.xls) attached to the VCS PD dated 6th Oct. 2009, states *Spreadsheet of generated energy, issued from CCEE,* when it cannot be, since CCEE's Sinercom system's (http://www.ccee.org.br/sinercom.jsp) values are different, as shown above. **CAR11**: Although the monitoring plan is consistent with the monitoring methodology, regarding the need for a double check of EG_y by receipt of sales, consistency of the collected data is not being ensured by sales invoices, whereas it has been defined as a QA/QC procedure under the PDD, B..7.1.	**CAR10** **CAR11**	Ok Ok

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
c. Have calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document?	VVM	199	Proposed CDM project activity emissions and leakage calculations have been appropriately carried out. However, baseline emissions have been unappropriately calculated, due to the use of *ex-post* calculations, while *ex-ante* had been chosen before (**see CAR3**), and of a wrong total amount of EG_y (**see CAR10**). **CAR12**: MR v01, B.1 and B.6, mention *version 10* of the approved methodology ACM0002, whereas Version 06 has been used for the PDD (see PDD, B.1). **CL4**: Please inform period of generation of *a total amount of 407,627 MWh* (MR v01, A.2) and explain value difference when compared to CDM registered PDD, on Section A.2 (PDD, A.2), which states *a total amount of 200,604 MWh* and, being conservative (PDD, A.2, Footnote 2), *192,720 MWh*. **CL5**: Please explain why EGy, during de monitoring period, presented a value which is around 83% higher than what results from an even distribution, on a daily basis, of the *value of data applied for the purpose of calculating expected emission reductions* (*192,720 MWh*), as defined in the PDD, B.7.1.	**CAR3** **CAR10** **CAR12** **CL4** **CL5**	Ok Ok Ok Ok Ok
d. Have any assumptions used in emission calculations been justified?	VVM	199	**See CAR4.**	**CAR4**	Ok
e. Have appropriate emission factors, IPCC default values and other reference values been correctly applied?	VVM	199	**See CAR4.**	**CAR4**	Ok

TABLE 2 RESOLUTION OF CORRECTIVE ACTION / FORWARD ACTION / CLARIFICATION REQUESTS.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR1: many parts of the MR v01 (e.g., under sections A.2 and B.3) are written as if the implementation and start of operation and monitoring of the 4th generation set had not occurred yet.	VVM 188	These sections were corrected indicating the 4th generation set had implemented.	Corrections have been made. CAR1 has been closed.
CAR2: MR v01, A.3, does not present information regarding the implementation, operation and monitoring of the 4th generation set.	VVM 188	It was indicated the 4th genset was installed in 3rd October 2006 and since then, the monitoring has been done properly, following specifications od the registered PDD.	Missing information has been added. CAR2 has been closed.
CAR3: Table 1, under MR v01, B.3, presents EG_y, EF_y, EF_OM_y and EF_BM_y as *Parameters monitored used to determine the monitoring period's emission reductions*. That would be applicable for *ex-post* calculations. However, according to PDD, B.6.1, the project proponent has chosen *ex-ante*: *The emission reduction ER_y by the project activity during a given year y will be calculated ex-ante […].* And as per ACM0002 Version 06, *The choice […] cannot be changed during the crediting period.* Additionally, PDD, B.7.1, states that only EG_y will be monitored. Therefore, the emission factor EF_{2008} to be used is 0.262, as per PDD, B.6.3.	VVM 196	This section was revised considering the unique monitored parameter EGy, as it is defined in the registered PDD.	Emission reduction calculations have been corrected, to reflect previously made *ex-ante* choice. CAR3 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR4: Registered CDM PDD, B.6.1, does not justify why Dispatch Data Analysis has not been chosen to calculate the Operating Margin emission factor(s) ($EF_{OM,y}$). Simple Adjusted OM method was used, whereas *Dispatch data analysis should be the first methodological choice*, according to ACM0002 Version 06.	VVM 196	The Simple Adjusted OM method was used, since low-cost/must run resources constitute less than 50% of total grid generation based on long-term normals for hydroelectricity production. Then, the Simple Adjusted OM considers the power sources (including imports) separated in low-cost/must-run power sources (*k*) and other power sources (*j*). However the Dispatch Data Analysis OM is the generation of the project (in MWh) in year and the operation margin is calculated based on the generation of the project (in MWh) in each hour h and relating to the hourly generation weighted average emissions per electricity unit (tCO2/MWh) of the set of power plants (n) in the top 10% of grid system dispatch order during hour h. Therefore, due to the available data from ONS, the Simple Adjusted OM was calculated instead of Dispatch Data Analysis.	Justification of the use of Simple Adjusted OM has been added. CAR4 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR5: Table 1, under MR v01, B.3, for parameter EGy, establishes measurement by the project developer. This is consistent with the PDD, where project developer and proponent are the same, but not in accordance with VCS PD dated 6th Oct. 2009, Clause 1.15, that mentions CantorCO2e Brasil as project developer and ENERGEST S.A. as project proponent.	VVM 196	Table 1 was deleted, yet the parameter was described in this section. Energest is the project developer and the project proponent, following the registered PDD.	The misuse of project proponent and project developer has been corrected. CAR5 has been closed.
CAR6: Escelsa's calibration reports of the 4th generation set kWh-meters, dated 19th Jun. 2009, present Power as meter manufacturer and 7550 as type of meter, not in accordance with the Brazilian Electric Power Commercialization Chamber – CCEE's meters information records, dated 13th Nov. 2009 (Net Energy) and 16th Nov. 2009 (Gross Energy), where Schneider is shown as manufacturer and ION7500-4Q as the model.	VVM 196	The manufacturer of the kwh - meter Power Measurement was acquired by Schneider, so manufacturers are equivalent, as can be confirmed at www.pwrm.com. The divergence of the model, with the merger there was a remodeling of the products from 7500 to 7550, they are equivalent, but the equipment is 7550. The "4Q" is just to indicate that the meter is 4 quarters. Energest has no control over the way that CCEE registers the meters. Please note that the primary key of control of CCEE / ONS is the code of the CCEE and the number of the manufacturer.	Information has been confirmed as per project participant's response. Besides, CCEE codes of gross and net kWh-meters match between calibration records and CCEE devices records. CAR6 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR7: As per Escelsa's calibration reports of the 4th generation set kWh-meters, dated 19th Jun. 2009 and 9th Jul. 2006, the calibration standard used (serial number 21.332) had not been calibrated within the 12-month frequency, established by the Brazilian Operator of the Electric System – ONS – (Grid Procedures – Submodule 12.5, Item 6.1.1): - Meters calibration on 19th Jun. 2009: calibration standard was last calibrated on 27th Aug. 2007 (certificate number 077/2007); - Meters calibration on 9th Jul. 2006: calibration standard had been last calibrated on 21st Nov. 2001 (certificate number 0370).	VVM 196	The standards were properly screened as procedures described in Chapter 12 of the CCEE / ONS (see Submodules) since there are 2 options for implementation of traceability (1 - Taking part in the Laboratory Intercomparison Program - PCI-Wh - Programa de Intercomparação laboratorial - PCI-Wh - or 2 - by way of - RBC / INMETRO). The two primary sources are approved, as described by submodule 12.5 which is contained in the flowchart below: (see attached file: pic16037.jpg) In the figure, the standard of service that is used by ESCELSA for calibration can be traced by RBC standard or by the reference standard PCI Wh. Traceability the years 2006/2007 and 2008: Traceability Fabrica / RBC - initial (See attached file: Inmetro_Inicial.pdf) (See attached file: Calibration INMETRO.pdf) (See attached file: Certificate FABRICA.pdf) Traceability in 2006: PCI Wh PCI-Wh - Movement 2006: 15/05 to 26/05, 2006 (See attached file: REPORT PCI Wh 2006_ANEXO1.pdf) Traceability in 2007: RBC - INMETRO	Official interlab comparison program PCI-Wh covers traceability of calibration standards, since Escelsa is a participating agent of the program. CAR7 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR7: continued from previous page.	VVM 196	PS: Escelsa was not involved in 2007 PCI, since it had calibrated its standard in RBC this year. (See attached file: Calibration INMETRO.pdf) Traceability in 2008: PCI Wh PCIWh 2008: 05/05 to 14/05 of 2008 (See attached file: REPORT PCI-E 26-01-2009-final-VS2.pdf) As it was mentioned, ESCELSA is a participant agent in the program inter-laboratory coordinated by ONS (Operador Nacional do Sistema), so since it is a valid trace and accepted by official responsible bodies for auditing ONS / CCEE – ANEEL and as described in Chapter 12 - submodule 12.5 - certification of labor standards it is considered that due to the optimization, cost and resources, it is required only a primary source for traceability. Then, the reports of traceability (attached) the service default used for the mentioned calibration is properly tracked and according to the legislation, which may be verified according to the supervisory body - CCEE / ONS that adopted Energest´s calibration report as below: (See attached file: screen SCDE.JPG)	(continued from previous page) Official interlab comparison program PCI-Wh covers traceability of calibration standards, since Escelsa is a participating agent of the program. CAR7 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR8: The following discrepancies have been found on the identification of the seals relevant to the 4th generation set kWh-meters, compared to the Inspection Reports dated 19th Jun. 2009: 1) Measurement panel's front door: BX06362-7 (verified) against BX22464-8 (Main – Gross Energy) and BX22524-5 (Net Energy – Main and Backup) in the reports; 2) Measurement panel's rear door: BX22808-1 (verified) against no information in the reports; 3) Calibration key of Main – Gross Energy: BX22522-3 (verified) against BX22522-2 in the report.	VVM 196	See justification in CL2.	The Brazilian Chamber for Electric Energy Commercialization has approved the reports numbers 5316 and 5302 for net and gross energy meters. CL2 has been closed. CAR8 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR9: Monitoring period relevant to MR v01 is shown incorrectly: 1) The expression between 29th January 2008 and 25th May 2008, under Section A.3, may lead to a misunderstanding regarding the inclusion or not of the days in the period limits. Please use an unequivocal expression and keep it along the entire MR. 2) Section B.3, on p.6, states an undefined monitoring period: from XX January to 25th May 2008. 3) Tables 2, 3, 4 and 8, under Section B.3, do not include the first 24 days of May 2008. 4) Table 5, under Section B.3, presents an incorrect start date (29/January/07). 5) Section B.4, in the first Data/Parameter table mentions during 29th January 2008 and 25th May 2008. 6) Table 7, under Section B.5, does not specify the days in January/2008. 7) Calculation sheets (VCS Monitoring 2008 - Mascarenhas v1.xls) attached to the VCS PD dated 6th Oct. 2009 present four tables with incorrect monitoring period in May/2008 (see Updated Calculation version 2 and Validation Info sheets).	VVM 199	1. The statement was rewritten as “from 29th January 2008 to 25th May 2008”. 2. Included dates from January (29, 30 and 31). 3. It was indicated in all tables: 1st to 25/May/08. 4. Corrected to 2008. 5. Corrected to “from 29th January 2008 to 25th May 2008”. 6. Dates were specified. 7. Data were corrected following Updated Calculation version 2 and Validation Info sheets that were sent.	Corrections have been made to monitoring period statements. CAR9 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR10: The total amount of electricity supplied to the grid by the project (EGy) during the monitoring period mentioned in the MR v01, is 114,193.305 MWh. This is 75,020 MWh less than the amount shown in the calculation sheets (VCS Monitoring 2008 - Mascarenhas v1.xls) attached to the VCS PD dated 6th Oct. 2009, which is 114,268.325 MWh. This discrepancy is due to the following: 1) Two hourly measures immediately prior to the first day of the monitoring period (38,661 MWh + 35,122 MWh) have been added; 2) Three hourly measures immediately prior to May 24th 2008 (45,213 MWh + 40,045 MWh + 39,897 MWh) have been double counted; and 3) The last three hourly measures of May 25th 2008 have not been added (41,364 MWh + 41,308 MWh + 41,246 MWh). Additionally, Validation Info sheet, in the calculation sheets (VCS Monitoring 2008 - Mascarenhas v1.xls) attached to the VCS PD dated 6th Oct. 2009, states Spreadsheet of generated energy, issued from CCEE, when it cannot be, since CCEE's Sinercom system's (http://www.ccee.org.br/sinercom.jsp) values are different, as shown above.	VVM 199	"VCS Monitoring 2008 – Mascarenhas v2" is available and the MWh values were corrected. Those values are in accordance to CCEE´s Sinercom system.	100% of the energy data has been crosschecked by the verification team against the Brazilian Chamber of Electric Energy Commercialization. CAR10 has been closed, since all discrepancies have been eliminated.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR11: Although the monitoring plan is consistent with the monitoring methodology, regarding the need for a double check of EGy by receipt of sales, consistency of the collected data is not being ensured by sales invoices, whereas it has been defined as a QA/QC procedure under the PDD, B.7.1.	VVM 199	These monitored values of MWh are only invoiced following ONS determinations (Specifically ONS - Submodules 12.1 to 12.6 http://www.ons.org.br/procedimentos/modulo_12.aspx). All the measurement points are authorized by CCEE and ANEEL (Submodule 12.2). As the generated energy by the fourth genset of Mascarenhas is sold in auctions, the sales invoices do not represent the total amount of energy generated. Then, this cross checking is not applicable to Energest, as can be seen in the document: "Fluxograma deMedição e Faturamento da Energia Vendida.doc" and "CELPA_CCEAR_EnergiaNova". The prevent maintenance and inspections are predicted under Submodule 12.3. The monitoring processes are defined under Submodule 12.4. The calibration specifications and standard of work certifications under Submodule 12.5. In Submodule 12.6, there is the revision of the measurements for the invoice emission. This shows the dynamic associated to the invoice procedures. And then, the generated energy is monitored by CCEE´s Sinercom System. And the exceeding energy is delivered to CCEE to distribute it properly.	100% of the energy data has been crosschecked by the verification team against the Brazilian Chamber of Electric Energy Commercialization. CAR11 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CAR12: MR v01, B.1 and B.6, mention version 10 of the approved methodology ACM0002, whereas Version 06 has been used for the PDD (see PDD, B.1).	VVM 199	Version of the methodology was corrected to 6.	Applicable methodology version number has been corrected. CAR12 has been closed.
CAR13: Monitoring Report Version 01, on Section A (MR v01, A), mentions project activity as being small scale, whereas it is a large scale one.	N/A	The Monitoring Report was corrected, indicating Mascarenhas as a large scale project activity.	Scale of the project activity has been corrected. CAR13 has been closed.
CAR14: Two different monitoring report completion dates are mentioned (MR v01, A.1 and B.7).	N/A	Those dates were corrected as the version 2 of the monitoring Report is presented.	A single report completion date has been used. CAR14 has been closed.
CAR15: MR v01, A.2, mentions a displacement of around 35,558 tCO2e. However, emission reduction value resulting from past electricity generation cannot be “around”, as it is a single number.	N/A	Statement corrected in section A.2.	Specific amount of tCO2e has been stated, without any expressions like “around”. CAR15 has been closed.
CAR16: Project activity title under MR v01, A.1, is different from the one under PDD, A.1.	N/A	Project Title was corrected in section A.1.	Project activity title has been corrected as per registered CDM PDD. CAR16 has been closed.
CL1: Last paragraph of MR v01, A.2, is not clear.	VVM 188	Paragraph was corrected.	Paragraph has been rewritten. CL1 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CL2: Please explain the existence of two different identifications of the seal of the measurement panel's front door – BX22464-8 (Main – Gross Energy kWh-meter) and BX22524-5 (Net Energy – Main and Backup kWh-meters) –, since it is a single panel and both inspection reports – where such IDs are recorded – are dated 19th Jun. 2009.	VVM 196	Following procedures stablished by CCEE/ONS for maintenance in SMF – Measurement System for Invoices, All the maintenances in Energest´s system are registered through SCDE (Sistema de Coleta de Dados Energéticos – Collecting System of Energetic Data) that is managed by CCEE. Then, the following documents are related to the registry of maintenances for UG4 of Mascarenhas, attached on the email sent "CAR 14 & CL 6 (VCS Mascarenhas - verification findings)" in 24th November 2009. 1- Print screen with the registry and status of intervention, net generation with notification registry of the 5316 maintenance and gross generation registered under nº 5302: (See attached file: tela SCDE.JPG) 2- Report detailing the registry of the maintenance, where it was attached all the inspection and calibration reports: (See attached file: Boletim de Ocorrencia de Manutenção Geração liquida.pdf)(See attached file: Boletim de Ocorrencia de Manutenção Geração Bruta.pdf) 3- Report containing registration data of measurement systems of the net and Gross generation. (See attached file: Dados Cadastrais - UGH4 Liquida.pdf)(See attached file: Dados Cadastrais - UGH4 Bruta.pdf) All the adopted procedures are in line with the procedures that command these activities and also with the common practice in this sector, as can be seen in figure of the first item, where the interventions are submitted to CCEE/ONS analysis and are approved by these entities.	The Brazilian Chamber for Electric Energy Commercialization has approved the reports numbers 5316 and 5302 for net and gross energy meters. CL2 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CL3: Please explain why the calibration key of the Net Energy – Backup kWh-meter, according to the inspection report dated 19th Jun. 2009, has been left unsealed, since the report shows it was found sealed.	VVM 196	See justification in CL2.	The Brazilian Chamber for Electric Energy Commercialization has approved the reports numbers 5316 and 5302 for net and gross energy meters. CL2 has been closed. CL3 has been closed.
CL4: Please inform period of generation of a total amount of 407,627 MWh (MR v01, A.2) and explain value difference when compared to CDM registered PDD, on Section A.2 (PDD, A.2), which states a total amount of 200,604 MWh and, being conservative (PDD, A.2, Footnote 2), 192,720 MWh.	VVM 199	The difference between the estimative in the PDD and the generation is that the generation is directly related to the hydrologic regime of the River and its availability, yet the assured energy (PDD) is a long-term analysis. And also *Mascarenhas* is a run-of-river power plant that do not have the capacity of saving water and, then, its generation is related to the water flow of the river. However, this value of 407,627 MWh of the monitoring report is wrong, since the assured energy for this 4th genset is 22.9 $MW_{average}$, which produces about 192,720 MWh/year, using conservative approach and 22 $MW_{average}$ for the calculation.	Amount of energy has been corrected. New value calculation is explained and over a specified period of time. CL4 has been closed.

Draft report clarifications and corrective action requests by verification team	Reference to checklist question in Periodic Verification Checklist	Summary of project owner response	Verification team conclusion
CL5: Please explain why EGy, during de monitoring period, presented a value which is around 83% higher than what results from an even distribution, on a daily basis, of the value of data applied for the purpose of calculating expected emission reductions (192,720 MWh), as defined in the PDD, B.7.1.	VVM 199	See justification in CL4.	Hydrological conditions of the river justify the difference of energy generated during the monitoring period. CL5 has been closed.
CL6: Please adjust sectoral scope name, under MR v01, B.1, as per CDM: Energy industries (renewable- / non-renewable sources).	N/A	Sectoral scope corrected.	Sectoral scope name has been adjusted. CL6 has been closed.
CL7: Please reposition the expression (table 3) in the last paragraph of p.6 of the MR v01, B.3, since the amount of energy generated is shown in Table 2.	N/A	Paragraph was rewritten.	Expression has been repositioned. CL7 has been closed.