



VERIFICATION AND CERTIFICATION REPORT

- 1ST PERIODIC –

CRISTALINO ENERGIA LTDA

CRISTALINO SMALL HYDROELECTRIC POWER PLANT
(HEREAFTER REFERRED TO AS “CRISTALSHP”)

UNFCCC REF. No. : 1800

Monitoring Period: 2008-12-15 to 2014-05-31
(incl. both days)

Report No: 10918 – 14/112

Date: 2014-12-08

TÜV NORD CERT GmbH
JI/CDM Certification Program
Langemarckstraße, 20
45141 Essen, Germany
Phone: +49-201-825-3329
Fax: +49-201-825-2139
www.tuev-nord.de
www.global-warming.de



Verification Report:	Report No.	Rev. No.	Date of 1st issue:	Date of this rev.
	10918 – 14/112	2	2014-12-08	2014-12-08
Project:	Title:		Registration date:	UNFCCC-No.:
	Cristalino Small Hydroelectric Power Plant (hereafter referred to as "CristalSHP")		2008-12-15	1800
			Verification No.:	
			1 st periodic verification	
	Crediting period:		From:	To:
	<input checked="" type="checkbox"/> Renewable (7y) <input type="checkbox"/> Fixed (10y)		2008-12-15	2014-12-14
Project Scale:				
	<input type="checkbox"/> Large Scale <input checked="" type="checkbox"/> Small Scale			
Project Participant(s):	Client:			
	Cristalino Energia Ltda			
	Non-Annex 1 country:		Annex 1 country:	
	Brazil		-	
	PP from non-Annex 1 country:		PP from Annex 1 country:	
Applied methodology/ies:	Title:		No.:	Scope(s) / TA(s)
	Grid connected renewable electricity generation		AMS-I.D ver. 12	1 / 1.2
Monitoring period and monitoring report	Monitoring period (MP):			Monitoring Report:
	From:	To:	No. of days:	Draft version:
	2008-12-15	2014-05-31	1,994	2014-08-18 – v. 1
Verification team / Technical Review and Final Approval:	Verification Team:			Technical review:
	Sergio Cruz			Martin Saalmann
Key dates of verification:	Publication of MR :		DVerR issued:	On-site (from):
	2014-09-01		2014-09-25	2014-09-17
Summary of Verification opinion	Cristalino Energia Ltda has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: "Cristalino Small Hydroelectric Power Plant (hereafter referred to as "CristalSHP")", with regard to the relevant requirements for CDM project activities.			
	<p>As a result of this verification, the verifier confirms that:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> all operations of the project are implemented and installed as planned and described in the validated project design document, <input checked="" type="checkbox"/> the monitoring plan is in accordance with the applied approved CDM methodology, <input checked="" type="checkbox"/> the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately, <input checked="" type="checkbox"/> the monitoring system is in place and functional. The project has generated GHG emission reductions, and <input checked="" type="checkbox"/> the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. <p>TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as listed below (verified amount).</p>			
Emission reductions: [t CO₂e]	Total verified amount		As per draft MR:	As per PDD:
	30,402		30,513	34,496 *
			ER achieved up to	ER achieved from

1st Periodic Verification and Certification Report: Cristalino Small
Hydroelectric Power Plant (hereafter referred to as "CristalSHP")

TÜV NORD JI/CDM Certification Program

R-No: 10918 – 14/112



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* Estimated at the registered PDD for a period of 1,994 days.

Abbreviations:

ANEEL	Brazilian National Agency of Electric Energy
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CO₂	Carbon dioxide
CO₂e	Carbon dioxide equivalent
CL	Clarification Request
DVerR	Draft Verification Report
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
IAP	Environmental Institute of the State of Paraná
MP	Monitoring Plan
MR	Monitoring Report
PA	Project Activity
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
XLS	Emission Reduction Calculation Spread Sheet

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1. INTRODUCTION

Cristalino Energia Ltda has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 1st periodic verification of the project

"Cristalino Small Hydroelectric Power Plant (hereafter referred to as "CristalSHP")"

with regard to the relevant requirements for CDM project activities. The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered CDM project.

GHG data for the monitoring period was verified in detailed manner applying the set of requirements, audit practices and principles as required under the Validation and Verification Standard^{/VVS/} of the UNFCCC.

This report summarizes the findings and conclusions of this 1st periodic verification of the above mentioned UNFCCC registered project activity.

1.1. Objective

The objective of the verification is the review and ex-post determination by an independent entity of the GHG emission reductions. It includes the verification of the:

- implementation and operation of the project activity as given in the PDD,
- compliance with applied approved methodology and the provisions of the monitoring plan,
- data given in the monitoring report by checking the monitoring records, the emissions reduction calculation and supporting evidence,
- accuracy of the monitoring equipment,
- quality of evidence,
- significance of reporting risks and risks of material misstatements.

1.2. Scope

The verification of this registered project is based on the validated project design document^{/PDD/}, the monitoring report^{/MR/}, emission reduction calculation spread sheet^{/XLS/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

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

- Article 12 of the Kyoto Protocol^{/KP/},
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1^{/MA/}, and subsequent decisions made by the Executive Board and COP/MOP,
- other relevant rules, including the host country legislation,



-
- CDM Validation and Verification Standard^{/VVS/}
 - monitoring plan as given in the registered PDD^{/PDD/},
 - Approved CDM Methodology.

2. GHG PROJECT DESCRIPTION

2.1. Technical Project Description

Small hydro power plant with installed capacity of 4 MW located on Barra Preta river in the city of Manoel Ribas – state of Paraná – Brazil.

The key parameters of the project are given in Table 2-1:

Table 2-1: Technical data of the project activity

Parameter	Unit	Value
Installed power	MW	4.0
Reservoir	m ²	880
Assured Generation	MW	2.83
Turbines (Moller)	Units	2
- Type		Francis horizontal
- Power (per unit)	MW	2.0
Generator #1 (Ansaldo)	Unit	1
- Serial number		349301
- Power	kVA	2,500
- Power factor		1.0
- Rotation	rpm	900
Generator #2 (Gevisa)	Unit	1
- Serial number		RXH227001432
- Power	kVA	2,500
- Power factor		0.8
- Rotation	rpm	900

2.2. Project Location

The details of the project location are given in Table 2-2:

Table 2-2: Project Location

No.	Project Location
Host Country	Brazil



Region:	State of Paraná – South Region
Project location address:	City of Manoel Ribas
Latitude:	24° 34'19" S
Longitude:	51°33'31" W

2.3. Project Verification History

Essential events since the registration of the project are presented below.

Not applicable as this is the first verification and no PRCs have been addressed until now.

3. METHODOLOGY AND VERIFICATION SEQUENCE

3.1. Verification Steps

The verification consisted of the following steps:

- Contract review,
- Appointment of team members and technical reviewers,
- Publication of the monitoring report,
- A desk review of the Monitoring Report^{/MR/} submitted by the client and additional supporting documents with the use of customized verification protocol^{/CPM/} according to the Validation and Verification Standard^{/VVS/},
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting,
- Resolution of corrective actions (if any),
- Final verification reporting,
- Technical review,
- Final approval of the verification.

3.2. Contract review

To assure that

- the project falls within the scopes for which accreditation is held,
- the necessary competences to carry out the verification can be provided,
- Impartiality issues are clear and in line with the CDM accreditation requirements

a contract review was carried out before the contract was signed.

3.3. Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities a verification team, consisting of one team leader and 1 additional team member, was appointed.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the Table 3-1 below.

Table 3-1: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sergio Cruz	BRTÜV	TL ^{A)}	LA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ricardo Lopes	BRTÜV	TR ^{B)}	LA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Martin Saalman	TÜV NORD, Germany	FA ^{B)}	SA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

¹⁾ TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

²⁾ GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

³⁾ GHG auditor status (at least Assessor)

⁴⁾ As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

B) No team member

All team members contributed to the review of documents, the assessment of the project activity and to the preparation of this report under the leadership of the team leader.

Statements of competence for the above mentioned team members are enclosed in annex 2 of this report.

3.4. Publication of the Monitoring Report

In accordance with the CDM M&P (§ 62) the draft monitoring report, as received from the project participants, has been made publicly available on the dedicated UNFCCC CDM website prior to the verification activity commenced. Comments received are taken into account in the course of the verification, if applicable.

3.5. Verification Planning

In order to ensure a complete, transparent and timely execution of the verification task the team leader has planned the complete sequence of events necessary to arrive at a substantiated final verification opinion.

Various tools have been established in order to ensure an effective verification planning.

Risk analysis and detailed audit testing planning

For the identification of potential reporting risks and the necessary detailed audit testing procedures for residual risk areas table A-1 is used. The structure and content of this table is given in Table 3-2 below.

Table 3-2: Table A-1; Identification of verification risk areas

Table A-1: 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 Forward Action Requests)
<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:</i> <ul style="list-style-type: none"> - 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 <i>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>

The completed table A-1 is enclosed in Annex 1 (table A-1) to this report.

Project specific periodic verification checklist

In order to ensure transparency and consideration of all relevant assessment criteria, a project specific verification protocol has been developed. The protocol shows, in a

transparent manner, criteria and requirements, means and results of the verification. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet for verification
- It ensures a transparent verification process where the verifying DOE documents how a particular requirement has been proved and the result of the verification.

The basic structure of this project specific verification protocol for the periodic verification is described in Table 3-3.

Table 3-3: Table A-2; Structure of the project specific periodic verification checklist

Table A-2: Periodic verification checklist				
Checklist Item	Reference	Verification Team Comments	Draft Conclusion	Final Conclusion
<i>The checklist items in Table A-2 are linked to the various requirements the monitoring of the project should meet. The checklist is organized in various sections as per the requirements of the topic and the individual project activity. It further includes guidance for the verification team.</i>	<i>Gives reference to the information source on which the assessment is based on.</i>	<i>The section is used to elaborate and discuss the checklist item in detail. It includes the assessment of the verification team and how the assessment was carried out. The reporting requirements of the VVS shall be covered in this section.</i>	<i>Assessment based on evidence provided if the criterion is fulfilled (OK), or a CAR, CL or FAR (see below) is raised. The assessment refers to the draft verification stage.</i>	<i>In case of a corrective action or a clarification the final assessment at the final verification stage is given.</i>

The periodic verification checklist (verification protocol) is the backbone of the complete verification starting from the desk review until final assessment. Detailed assessments and findings are discussed within this checklist and not necessarily repeated in the main text of this report.

The completed verification protocol is enclosed in Annex 1 (table A-2) to this report.

3.6. Desk review

During the desk review all documents initially provided by the client and publicly available documents relevant for the verification were reviewed. The main documents are listed below:

- the last revision of the PDD including the monitoring plan^{/PDD/},
- the last revision of the validation report^{/VAL/},
- documentation of previous verifications^{/VER/}
- the monitoring report, including the claimed emission reductions for the project^{/MR/},
- the emission reduction calculation spreadsheet^{/XLS/}.

Other supporting documents, such as publicly available information on the UNFCCC website and background information were also reviewed.

3.7. On-site assessment

As most essential part of the verification exercise it is 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 main tasks covered during the site visit include, but are not limited to:

- The monitoring data were checked completely.
- An assessment of the implementation and operation of the registered project activity as per the registered PDD or any approved revised PDD;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- The data aggregation trails were checked via spot sample down to the level of the meter recordings.
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;
- A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;
- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

Before and during the on-site visit the verification team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

Representatives of Cristalino Energia Ltda and Carbotrader (project consultant) including the operational staff of the plant were interviewed. The main topics of the interviews are summarized in Table 3-4.

Table 3-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
--------------------------------	------------------

Interviewed Persons / Entities	Interview topics
<ol style="list-style-type: none"> 1. Projects & Operations Personnel 2. Consultant 	<ul style="list-style-type: none"> - General aspects of the project - Technical equipment and operation - Changes since validation / previous verification - Monitoring and measurement equipment - Remaining issues from validation/ previous verification - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - GHG emission reduction calculation - Procedural aspects of the verification - Maintenance - Environmental aspects

The list of interviewees is included in chapter 7.4.

3.8. Draft verification reporting

On the basis of the desk review, the on-site visit, follow-up interviews and further background investigation the verification protocol is completed. This protocol together with a general project and procedural description of the verification and a detailed list of the verification findings form the draft verification report. This report is sent to the client for resolution of raised CARs, CLs and FARs.

3.9. Resolution of CARs, CLs and FARs

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:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;

- Issues identified in a FAR during validation or previous verifications requiring actions by the project participants to be verified during verification have not been resolved.

The verification team uses the term Clarification Request (CL), which is issued if:

- information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

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

- the monitoring and reporting require attention and / or adjustment for the next verification period.

For a detailed list of all CARs, CLs and FARs raised in the course of the verification pl. refer to chapter 4.

3.10. Final reporting

Upon successful closure of all raised CARs and CLs the final verification report including a positive verification opinion can be issued. In case not all essential issues could finally be resolved, a final report including a negative verification opinion is issued.

The final report summarizes the final assessments w.r.t. all applicable criteria.

3.11. Technical review

Before submission of the final verification report a technical review of the whole verification procedure is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the verification opinion and the topic specific assessments as prepared by the verification team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

3.12. Final approval

After successful technical review an overall (esp. procedural) assessment of the complete verification will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

After this step the request for issuance can be started.

4. VERIFICATION FINDINGS

In the following paragraphs the findings from the desk review of the monitoring report^{/MR/}, the calculation spreadsheet^{/XLS/}, PDD^{/PDD/}, the Validation Report^{/VAL/} and other supporting documents, as well as from the on-site assessment and the interviews are summarized.

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

Table 4-1: Summary of CAR, CL and FAR

Verification topic	No. of CAR	No. of CL	No. of FAR
A – Description of project activity	0	0	0
B – Implementation of project activity	0	3	0
C – Description of monitoring system	0	4	0
D – Data and parameters	2	0	0
E - Calculation of Emission Reductions	0	0	0
SUM	2	7	0

The following tables include all raised CARs, CLs and FARs and the assessments of the same by the verification team. For an in depth evaluation of all verification items it should be referred to the verification protocols (see Annex).

Finding	CL B1		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	At Section B.1 of the MR, some data presented at tables 2 and 3 are not consistent with the ones evidenced during the site visit regarding the technical description of the installed equipment.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	It was corrected in the MR version 2.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): B.1	New version No.:2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <i>The assessment shall encom-</i>	The technical data presented at tables 2 and 3 have been revised		

Finding	CL B1
pass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	and are now consistent with the evidences checked during the site visit. CL is closed
Conclusion Tick the appropriate checkbox	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	CL B2		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	It was verified during the site visit that there were events that caused downtimes of the operation that were not listed at Section B.1 of the MR. In addition, it was verified delays in the calibrations of the two meters that were also not reported.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The events were put in the MR version 2. The delays were corrected in the CERs 1st MR-rev2 sheet and put in the MR version 2 too.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): B.1	New version No.:2
	<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The calibration delays of the meters (from 2008-12-15 to 2009-05-13 and from 2013-05-10 to 2013-06-09) are now reported. However, not all events that caused downtimes have been included at Section B.1 of the MR as the monitoring for the month of July/2013 is equal to zero and no justification has been given. <u>CL remains open</u>		
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The information was put in the MR version 3 Section B.1.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): B.1	New version No.:3
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #2 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	It was included in section B.1 information that on 2013-06-26, due to heavy rains in the region, there was a slip of the embankment on the left bank of the channel. The problem was solved only on 2013-08-09, and during this period the electricity generation was interrupted.		

Finding	CL B2
	<p>Therefore, no CERs are claimed for the period.</p> <p>The information is in accordance with the generation reports^{/GEN/} and interviews performed during the site visit.</p> <p>CL is closed</p>
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	CL B3								
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR						
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>The monitoring system verified on site was the use of the Emeter system reports as main source of generated electricity and CCEE reports (SINERCOM and CLIQCCEE) for cross-checking the generated electricity. The worksheets from Grameyer system is used only for internal control of the operator.</p> <p>Thus, the actual situation of the monitoring system does not present a change to the system described at the registered PDD, contrary to indicated in Section B.2.4 of the MR.</p>								
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	<p>The MR version 2 was modified. There were no changes in this item and Grameyer continues to be used.</p> <table><tr><td><input checked="" type="checkbox"/> Changes in MR</td><td>Section(s): B.2.4</td><td>New version No.: 2</td></tr><tr><td><input type="checkbox"/> Changes in XLS</td><td>Worksheet(s):</td><td>New version No.:</td></tr></table>			<input checked="" type="checkbox"/> Changes in MR	Section(s): B.2.4	New version No.: 2	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<input checked="" type="checkbox"/> Changes in MR	Section(s): B.2.4	New version No.: 2							
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:							
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>As verified during the site visit, Grameyer system is being used by the plant staff in order to have local information that can impact the operation. Worksheets are compiled directly from the information of the Grameyer system in order to provide internal control to plant operators. Those worksheets are also available for data cross-checking.</p> <p>Therefore, as the system has not been changed, no change to project design of the registered PDD has been verified and the respective section B.2.4 of the MR has been revised, excluding such information.</p> <p><u>CL is closed</u></p>								
Conclusion <i>Tick the appropriate checkbox</i>	<div><input type="checkbox"/> To be checked during the next periodic verification</div> <div><input type="checkbox"/> Additional action should be taken (finding remains open)</div> <div><input checked="" type="checkbox"/> The finding is closed</div>								

Finding	CL C4		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	At Section C of the MR, it is missing a monitoring system diagram as per the "Instructions for filling out the monitoring report form".		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	It was put in the MR version 2.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): C	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	A monitoring system diagram has been included at Section C. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	CL C5		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The organigram presented at Section C of the MR is not in accordance with the organigram presented in the registered monitoring plan.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	It was changed in the MR version 2. There was no change in the Cristalino management structure.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): C	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	As confirmed during the site visit, there was no change at Cristalino's management structure. Thus, the organigram has been revised and the one presented now is the same presented at the registered PDD. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	CL C6		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	It was revealed during the site visit that there are emergency procedures for the monitoring system established by operator. Nevertheless, they are missing at Section C of the MR.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	It was described in MR version 2 that there is an Emergency Plan and some topics covered by it.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): C	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The emergency procedures evidenced during the site visit have been included at Section C of the MR. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	CL C7		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The procedures about data collection and data archive are missing at Section C of the MR.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	The description in the MR version 2 was modified to better explain.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): C	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The procedures of data collection and data archive evidenced during the site visit have been included and better explained at Section C of the MR. <u>CL is closed</u>		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	CAR D8
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Finding	CAR D8		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	At the Excel spreadsheet, the values of generated electricity (EG _y) for the months of May/2009 and June/2013 are not correct as the periods used for the corrections of the maximum permissible error due to the calibration delays are not correct.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	This was corrected in the CERs 1st MR-rev2.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): D.2; E.1; E.4; E.5; E.7	New version No.: 2
	<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): CERs	New version No.: 2
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>The values of generated electricity for the months of May/2009 and June/2013 are now correct and in accordance with evidences presented.</p> <p>The values of the generation by month are presented at the Excel spreadsheet.</p> <p><u>CAR is closed</u></p>		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed		

Finding	CAR D9		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>As verified during the site visit, some of the values of generated electricity presented at the MR and used for the calculations are not the most conservative ones among the values of CCEE reports and Emeter reports used for cross checking.</p> <p>Revise the calculations.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details. In case the MR is changed as part of the CA, the PP is requested to indicate the revised sections as well as the new version No.</i>	This was corrected in the CERs 1st MR-rev2, using new tab "Measures".		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): D.2; E.1; E.4; E.5; E.7	New version No.: 2
	<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): CERs	New version No.: 2
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex</i>	The most conservative values among CCEE reports and Emeter		



Finding	CAR D9
A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	reports have now been used for the calculations. <u>CAR is closed</u>
Conclusion Tick the appropriate checkbox	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

5. SUMMARY OF VERIFICATION ASSESSMENTS

The following paragraphs include the summary of the final verification assessments after all CARs and CLs are closed out. For details of the assessments pl. refer to the discussion of the verification findings in chapter 4 and the verification protocol (Annex 1).

5.1. Involved Parties and Project Participants

The following parties to the Kyoto Protocol and project participants are involved in this project activity.

Table 5-1: Project Parties and project participants

Characteristic	Party	Project Participant
Non-Annex 1	Brazil	Cristalino Energia Ltda

5.2. Implementation of the project

During the verification a site visit was carried out. On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipment, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the registered PDD.

Cristalino hydroelectric power plant is located on Barra Preta River, in the city of Manoel Ribas, state of Paraná, southern Brazil. The main equipment (turbines and generators) were not exchanged or modified during the monitoring period. The values of the dispatched electricity to the grid have been provided by electricity meters via E-meter software and cross-checked against data reports in CCEE system. All physical features of the CDM project activity proposed in the registered PDD are in place. The project participant has implemented and operated the project activity as per the approved PDD.

5.3. Project history

During the validation, all raised issues were closed and resolved. No FAR has been raised. No such issues were identified for this project.

Furthermore as this is the 1st periodic verification, no issues from former verifications are to be considered.

The project has been registered on 2008-12-15 (Ref.: 1800); the starting date of the crediting period was 2008-12-15 and this 1st monitoring period is from 2008-12-15 to 2014-05-31 (both days included).

5.4. Post registration changes

No post registration changes applicable for this monitoring period have been observed during the monitoring period.

5.5. Compliance with the monitoring plan

The monitoring system and all applied procedures are completely in compliance to the registered monitoring plan.

The submitted monitoring report which is the basis of the verification was prepared by summarizing consolidated monthly data over the whole monitoring period in accordance with the monitoring plan of the registered PDD. The procedures are totally in compliance with the directives of the approved monitoring plan which could be confirmed by plant operators and CDM project manager during the site visit.

In addition, some events happened during the monitoring period which caused the interruption of the project activity. Those events were due to circuit breaker opening and predictive and preventive maintenance and they were not significant and with no impact for the monitoring of the project activity.

Nevertheless, a significant event occurred on 2013-06-26. Due to heavy rains in the region, there was a slip of the embankment on the left bank of the channel. The problem was solved only on 2013-08-09 and during this period the electricity generation was interrupted. No CERs are claimed for the period (from 2013-06-26 to 2013-08-09).

The measurements of the generated and delivered electricity are performed at Manuel Ribas Substation.

5.6. Compliance with the monitoring methodology

The monitoring system is in compliance with the applied monitoring methodology (AMS-I.D – "Grid connected renewable electricity generation" – version 12).

The monitoring report and emissions reduction calculations are in line with the requirements of the validated monitoring plan as well as with the applied methodology.

The reporting procedures reflect the requirements of the monitoring plan.

5.7. Monitoring parameters

During the verification all relevant monitoring parameters (as listed in chapter B.7.1 of the PDD) have been verified with regard to the appropriateness of the applied measurement / determination method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures. The results as well as the verification procedure are described parameter-wise in the project specific verification checklist.

As per the registered monitoring plan, the calibrations shall be performed every three years. Nevertheless, national standards set the calibration frequency to two years. Therefore, delayed calibrations have been verified when the frequency of two years is considered. Thus, as the errors of the calibrations were smaller than the maximum permissible error determined by the manufacturer (0.2%) and according to the "*Guidelines for assessing compliance with the calibration frequency requirements*" and in a conservative approach, the maximum permissible error was discounted in the calculation for two periods: from 2008-12-15 to 2009-05-13 and from 2013-05-10 to 2013-06-09.

The calibrations of all monitoring equipment installed have been verified as listed in table given in Annex 3 to this report.

After appropriate corrections were carried out by the project participant it can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with all applicable standards and relevant requirements.

The parameter *Electricity generated by the renewable technology in the year y* (EG_y) was checked by the verification team. This parameter consists in the sum of the total electricity generated by the project activity.

The monitoring of the net generated energy per plant, per month and per monitoring substation is presented below:

YEAR 2008	December	1,235.607
YEAR 2009	January	2,086.434
	February	2,424.598
	March	1,870.828
	April	1,051.865
	May	1,096.846
	June	1,005.491
	July	2,576.349
	August	2,919.330
	September	2,836.916

	October	2,911.975
	November	2,857.092
	December	2,896.604
YEAR 2010	January	2,939.276
	February	2,661.296
	March	2,299.281
	April	2,045.969
	May	2,686.423
	June	1,821.592
	July	1,486.550
	August	954.544
	September	644.545
	October	1,059.679
	November	761.431
	December	1,779.176
YEAR 2011	January	1,834.316
	February	2,090.088
	March	1,700.154
	April	1,674.069
	May	1,199.377
	June	1,261.960
	July	2,404.864
	August	2,967.618
	September	2,685.210
	October	1,059.679
	November	2,297.954
	December	1,500.434
YEAR 2012	January	1,338.301
	February	784.900
	March	641.840
	April	859.501
	May	1,611.981

	June	2,683.235
	July	2,597.014
	August	1,560.334
	September	168.646
	October	848.801
	November	1,234.009
	December	1,189.364
YEAR 2013	January	1,778.368
	February	2,302.206
	March	2,934.368
	April	2,836.453
	May	2,356.060
	June	1,848.861
	July	0
	August	1,247.361
	September	1,725.755
	October	1,853.603
	November	1,138.614
	December	1,130.374
YEAR 2014	January	48.531
	February	958.393
	March	1,910.892
	April	2,663.234
	May	2,644.439

All those values are cross-checked with the monthly sales reports provided by the Chamber of Commercialization of Electric Energy (CCEE), therefore, being in compliance with the registered monitoring plan. For further information, refer to Annex 1, section D, where the monitored parameter is fully assessed. The records and consolidated data are the basis for the calculation of the emissions reduction. All relevant evidences were fully checked by the verification team during the site visit. The necessary monitoring instruments are installed. The measuring devices are in good conditions and found to be accurate and reliable. Calibration certificates of all installed meters were checked and deemed satisfactory. All calibration certificates are valid for this monitoring period; the calibration details are stated in table 7 of the

monitoring report. The error of 0.2% was discounted due to the calibration delays and is applied to the respective values above for the specific periods (from 2008-12-15 to 2009-05-13 and from 2013-05-10 to 2013-06-09) in the calculation of ERs.

All records needed for monitoring are archived in line with the requirements of the approved revised monitoring plan. No significant lack of evidence and missing data were detected during the on-site verification.

5.8. Monitoring report

A draft monitoring report was submitted to the verification team by the project participants. The team has made this report publicly available prior to the start of the verification activities. No comments were received.

During the verification, mistakes and needs for clarification were identified. The PP has carried out the requested corrections so that it can be confirmed that the Monitoring report is complete and transparent and in accordance with the registered PDD and other relevant requirements.

In the process of the verification, 02 CAR and 07 CLs were raised and successfully closed. No FAR has been raised in this monitoring period. The findings are described in Section 4 of this Report.

5.9. Sampling

5.10. Implementation of the sampling plan

No sampling was required to determine the monitored parameters.

5.11. Sampling approaches during verification

No sampling approaches were taken during the verification.

5.12. ER Calculation

During the verification mistakes in the ER calculation were identified. Corresponding CARs were raised. A revised ER calculation was prepared by the PP and presented to the verification team. All raised issues were addressed appropriately so that all corresponding CARs could be closed out. Thus it is confirmed that the ER calculation is overall correct.

The emission reductions (ER_y) were calculated by the product of Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" ($EF_{grid,CM,y}$) and quantity of net electricity generation supplied by the project plant/unit to the grid in in year y ($EG_{PJ,y}$).

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

As project emissions and project leakage are equal to zero, the emission reductions are equal to baseline emissions.

$$BE_{2008} = 1,233.14 \times 0.2611$$

$$BE_{2008} = ER_{2008} = 321 \text{ tCO}_2\text{e}$$

$$BE_{2009} = 26,514.99 \times 0.2611$$

$$BE_{2009} = ER_{2009} = 6,923 \text{ tCO}_2\text{e}$$

$$BE_{2010} = 21,139.76 \times 0.2611$$

$$BE_{2010} = ER_{2010} = 5,519 \text{ tCO}_2\text{e}$$

$$BE_{2011} = 22,675.72 \times 0.2611$$

$$BE_{2011} = ER_{2011} = 5,920 \text{ tCO}_2\text{e}$$

$$BE_{2012} = 15,517.93 \times 0.2611$$

$$BE_{2012} = ER_{2012} = 4,051 \text{ tCO}_2\text{e}$$

$$BE_{2013} = 21,148.43 \times 0.2611$$

$$BE_{2013} = ER_{2013} = 5,521 \text{ tCO}_2\text{e}$$

$$BE_{2014} = 8,225.49 \times 0.2611$$

$$BE_{2014} = ER_{2014} = 2,147 \text{ tCO}_2\text{e}$$

$$BE_{Total} = 116,455.45 \times 0.2611$$

$$BE_{Total} = ER_{Total} = 30,402 \text{ tCO}_2\text{e}$$

5.13. Quality Management

Quality Management procedures for measurements, collection and compilation of data, data storage and archiving, calibration, maintenance and training of personnel in the framework of this CDM project activity have been defined. The procedures defined can be assessed as appropriate for the purpose. No significant deviations thereof have been observed during the verification.

5.14. Actual emission reductions during the first commitment period and the period from 1 January 2013 onwards

The MR includes actual ER values achieved up to 31 December 2012 and actual values achieved from 1 January 2013 onwards as follows:

Table 5-2: Emission reductions before and after the end of 2012

	until 2012-12-31 ¹⁾	from 2013-01-01 ¹⁾	Sum
Emission reductions [tCO ₂ e]	22,734	7,668	30,402

¹⁾ Both days included

5.15. Comparison with ex-ante estimated emission reductions

The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD.

The calculated value was found to be proportionally lower than the ex-post determined value, thus no further justification was required.

5.16. Overall Aspects of the Verification

All necessary and requested documentation was provided by the project participants so that a complete verification of all relevant issues could be carried out.

Access was granted to all installations of the plant which are relevant for the project performance and the monitoring activities.

No issues have been identified indicating that the implementation of the project activity and the steps to claim emission reductions are not compliant with the UNFCCC criteria and relevant guidance provided by the COP/CMP and the CDM EB (clarifications and/or guidance).

5.17. Hints for next periodic Verification

Not applicable as no FAR was raised.

6. VERIFICATION AND CERTIFICATION STATEMENT

Cristalino Energia Ltda has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: "Cristalino Small Hydroelectric Power Plant (hereafter referred to as "CristalSHP")", with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to generating electricity from renewable hydroelectric source and replacing thermal generation from fossil fuels that would have been inputted in the system. This verification covers the period from 2008-12-15 to 2014-05-31(including both days).

In the course of the verification 2 Corrective Action Requests (CAR) and 7 Clarification Requests (CL) were raised and successfully closed. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the registered PDD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated project design document.
- the monitoring plan is in accordance with the applied approved CDM methodology, i.e., AMS-I.D ver. 12
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 1st 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:

Emission reductions: **30,402** t CO₂e

São Paulo, 2014-12-08



Sergio Cruz

TÜV NORD JI/CDM Certification
Program

Essen, 2014-12-08



Martin Saalman

TÜV NORD JI/CDM Certification
Program

1st Periodic Verification and Certification Report: Cristalino Small
Hydroelectric Power Plant (hereafter referred to as "CristalSHP")

TÜV NORD JI/CDM Certification Program

R-No: 10918 – 14/112



Verification Team Leader

Final Approval

7. REFERENCES

Table 7-1: Documents provided by the project participant(s)

Reference	Document
/CAL/	<p><u>Calibration Certificates of Meters:</u></p> <p>Main Meter – Serial # 504455</p> <ul style="list-style-type: none"> - Certificate # CCR 282/05 – calibration on 2005-06-09 – valid until 2007-06-08 – Lactec - Certificate # CCL 075/09 – calibration on 2009-05-14 – valid until 2011-05-13 – Lactec - Certificate # 504455 – calibration on 2011-05-10 – valid until 2013-05-09 – Progressul - Certificate # CCR 555/13 – calibration on 2013-06-10 – valid until 2015-06-09 – Lactec <p>Backup – Serial # 504456</p> <ul style="list-style-type: none"> - Certificate # CCR 283/05 – calibration on 2005-06-09 – valid until 2007-06-08 – Lactec - Certificate # CCL 074/09 – calibration on 2009-05-14 – valid until 2011-05-13 – Lactec - Certificate # 504456 – calibration on 2011-05-10 – valid until 2013-05-09 – Progressul - Certificate # CCR 556/13 – calibration on 2013-06-10 – valid until 2015-06-09 – Lactec
/CON/	Contract among Cristalino Energia Ltda and TÜV Nord – 14CDMBR060105 – 2014-06-20
/GEN/	<p><u>Generated Energy:</u></p> <ul style="list-style-type: none"> - Emeter – System of Generated Electricity Data – Vectorlog - CCEE Reports – System Sinercom and System CLIQCCEE
/LIC/	<p><u>Environmental Licenses:</u></p> <ul style="list-style-type: none"> - Operational License # 7536 – IAP – 2008-09-22 – valid until 2012-09-22

Reference	Document
	<ul style="list-style-type: none"> - Operational License # 7536 – IAP – 2013-07-18 – valid until 2018-07-18 <u>Municipal License:</u> <ul style="list-style-type: none"> - License #00000384 – City Hall of Manoel Ribas – 2014-02-04
/MAIN/	<u>Equipment, Operation and Management Manuals:</u> <ul style="list-style-type: none"> - Electric Panel 1 and 2 Diagram – Op004466 – Grameyer – 2005-02-21 - Manual of Turbine Möller – Möller – Jan/2006 - Operation and Maintenance Manual – Correcto Outsourcing and Cristalino Energia – 2010-11-24 <u>Training Manuals:</u> <ul style="list-style-type: none"> - CDM Monitoring Manual – Carbotrader – Jun/2011 <u>Programmed and non-Programmed stops:</u> <ul style="list-style-type: none"> - Report of Events <u>Generated Electricity Data Control:</u> <ul style="list-style-type: none"> - Contract of Representation and Operation – EE-CRO-159/2010 – among Cristalino Energia Ltda and Electra Comercializadora de Energia Ltda. – 2011-01-01
/MR/	<p>Monitoring Report "Cristalino Small Hydroelectric Power Plant (hereafter referred to as "CristalSHP")"</p> <ul style="list-style-type: none"> - version 1 – 2014-08-18 - version 2 – 2014-09-30 - version 3 – 2014-11-13
/XLS/	<p>Excel spreadsheets calculations</p> <ul style="list-style-type: none"> - rev. 1 - rev. 2

Table 7-2: Background investigation and assessment documents

Reference	Document
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Reference	Document
/AMS/	AMS-I.D ver. 12 – “Grid connected renewable electricity generation”
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/IPCC/	<ol style="list-style-type: none"> 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/MRT/	Monitoring Report Form (CDM-MR-FORM) – version 04.0
/PDD/	Project Design Document for CDM project: “Cristalino Small Hydroelectric Power Plant (hereafter referred to as “CristalSHP”)” – version 5 – 2008-09-16
/PS/	CDM Project Standard (Version 07.0)
/VAL/	Validation Report for CDM project “Cristalino Small Hydroelectric Power Plant (hereafter referred to as “CristalSHP”)” – rev. 03B – SGS – 2008-12-09
/VVS/	CDM Validation and Verification Standard (Version 07.0)

Table 7-3: Websites used

Reference	Link	Organization
/aneel/	www.aneel.gov.br	Brazilian National Agency of Electric Energy

Reference	Link	Organization
/dna /	http://www.mct.gov.br	DNA of Brazil
/ccee/	www.ccee.org.br	Chamber of Commercialization of Electric Energy
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 7-4: List of interviewed persons

Reference	Mol ¹		Name	Organization / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Walter Camargo	Cristalino Energia / Director
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Gilberto Carneiro da Silva	Cristalino Energia / Supervisor
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Jairo Goetert	Cristalino Energia / Operator
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Arthur Moraes	Carbotrader / Consultant
/IM03/	T	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Ana Carla de Oliveira	Electra Energy / Trading Manager
/IM03/	T	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Júlio Vieira	Electra Energy / Trading Assistant

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)

ANNEX

- A1:** Verification Protocol
- A2:** Calibration dates and validity of
installed monitoring equipment
- A3:** Statements of Competence of
involved Personnel

ANNEX 1: VERIFICATION PROTOCOL

Table A-1: 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	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
Raw data generation				
<ul style="list-style-type: none"> • Installation of measuring equipment • Dysfunction of installed equipment • Maloperation by operational personnel • Downtimes of equipment • Exchange of equipment • Change of measurement equipment characteristic • Insufficient accuracy • Change of technology 	<ul style="list-style-type: none"> • Installation of modern and state of the art equipment • Process control automation • Internal data review • Regular visual inspections of installed equipment • Only skilled and trained personnel operates the relevant equipment • Daily raw data checks • Immediate exchange of dysfunctional equipment • Stand-by duty is 	<ul style="list-style-type: none"> • Inadequate installation / operation of the monitoring equipment • Inadequate exchange of equipment • Change of personnel • Undetected measurement errors • Inappropriateness of Management system procedures w.r.t. monitoring plan requirements (e.g. substitute value strategies) • Non-application of management system procedures • Insufficient accuracy • Inappropriate QA/QC 	<ul style="list-style-type: none"> • Site – visit • Check of equipment • Check of technical data sheets • Check of suppliers information / guarantees • Check of calibration records, if applicable • Check of maintenance records • Counter-check of raw data and commercial data • Check of CDM management system • Check of CDM related procedures 	<ul style="list-style-type: none"> • See Table A-2

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
<ul style="list-style-type: none"> Accuracy of values supplied by Third Parties 	<ul style="list-style-type: none"> organized Training Internal audit procedures Internal check of QA/QC measures of involved Third Parties 	<ul style="list-style-type: none"> measures of Third Parties 	<ul style="list-style-type: none"> Application of CDM management system procedures Check of trainings Check of responsibilities Check of QA/QC documentation / evidences of involved Third Parties 	
Raw data collection and data aggregation				
<ul style="list-style-type: none"> Wrong data transfer from raw data to daily and monthly aggregated reporting forms IT Systems Spread sheet programming Manual data transmission Data protection Responsibilities 	<ul style="list-style-type: none"> Cross-check of data Plausibility checks of various parameters. Appropriate archiving system Clear allocation of responsibilities Application of CDM Management system procedures Usage of standard software solutions 	<ul style="list-style-type: none"> Unintended usage of old data that has been revised Incomplete documentation Ex-post corrections of records Ambiguous sources of information Non-application of management system procedures Manual data transfer mistakes 	<ul style="list-style-type: none"> Check of data aggregation steps Counter-calculation Data integrity checks by means of graphical data analysis and calculation of specific performance figures Check of management system certification Check of data archiving system 	<ul style="list-style-type: none"> See Table A-2

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
	(Spreadsheets) <ul style="list-style-type: none"> Limited access to IT systems Data protection procedures 	<ul style="list-style-type: none"> Unintended change of spread sheet programming or data base entries Problems caused by updating/upgrading or change of applied software 	<ul style="list-style-type: none"> Check of application of Management system procedures 	
Other calculation parameters				
<ul style="list-style-type: none"> Emission factors, oxidation factors, coefficients 	<ul style="list-style-type: none"> The values and data sources applied are defined in the PDD and monitoring plan 	<ul style="list-style-type: none"> Unintended or intended Modification of calculation parameters Wrong application of values Misinterpretations of the applied methodology and/ or the PDD Missing update of applicable regulatory framework (e.g. IPCC values) 	<ul style="list-style-type: none"> Update-check of regulatory framework Countercheck of the applied MP in the MR against the methodology and the PDD 	<ul style="list-style-type: none"> See Table A-2
Calculation Methods				

Identification of potential reporting risk	Identification, assessment and testing of management controls	Areas of residual risks	Additional verification testing	Conclusions and Areas Requiring Improvement (including <i>Forward Action Requests</i>)
<ul style="list-style-type: none"> Applied formulae Miscalculation Mistakes in spread-sheet calculation 	<ul style="list-style-type: none"> Advanced calculation and reporting tools A CDM coordinator is in charge of the CDM related calculations Usage of tested / counterchecked Excel spreadsheets Involvement of external consultants 	<ul style="list-style-type: none"> The danger of miscalculation can only be minimized. 	<ul style="list-style-type: none"> Countercheck on the basis of own calculation. Spread sheet walk-through. Plausibility checks Check of plots 	<ul style="list-style-type: none"> See Table A-2
Monitoring reporting				
<ul style="list-style-type: none"> Data transfer to the author of the monitoring report Data transfer to the monitoring report Unintended use of outdated versions 	<ul style="list-style-type: none"> An experienced CDM consultant is responsible for monitoring reporting. CDM QMS procedures are defined 	<ul style="list-style-type: none"> The danger of data transfer mistakes can only be minimized Inappropriate application of QMS procedures 	<ul style="list-style-type: none"> Counter check with evidences provided. Audit of procedure application 	<ul style="list-style-type: none"> See Table A-2

Table A-2: (Project specific) Periodic Verification Checklist

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
A. Description of the project activity				
A.1. Purpose and general description of the project activity (F-CDM-FORM, Attachment, A.1) <i>Check if section A.1 of the MR includes the following:</i> <ul style="list-style-type: none"> - Purpose of the PA and the measures taken to reduce GHG emissions - Brief description of the installed technology and equipment - Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.) - Total emission reductions achieved in this monitoring period 	/MR/	<p>The verification team has checked section A.1 of the MR and confirms that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Purpose of the PA and the measures taken to reduce GHG emissions <input checked="" type="checkbox"/> Brief description of the installed technology and equipment <input checked="" type="checkbox"/> Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.) <input checked="" type="checkbox"/> Total emission reductions achieved in this monitoring period <p>In this context the following findings have been identified: N/A</p>	OK	OK
A.2. Location of project activity (F-CDM-FORM, Attachment , A.2) <i>Check if section A.2 of the MR reflects correctly the following:</i> <ul style="list-style-type: none"> - Host Party(ies) - Region / State / Province etc. - City / Town / Community etc. 	/MR/ /PDD/ /IM/	<p>The verification team has checked section A.2 of the MR and confirms by means of comparison with the information given in the PDD and information gathered during the site visit that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Host Party(ies) <input checked="" type="checkbox"/> Region / State / Province 	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
- <i>Physical / geographical location (e.g. Latitude and Longitude)</i>		<input checked="" type="checkbox"/> City / Town / Community <input checked="" type="checkbox"/> Physical / Geographical location In this context the following findings have been identified: N/A		
A.3. Parties and Project Participants (F-CDM-FORM, Attachment, A.3) <i>Check if section A.3 of the MR includes the following:</i> <ul style="list-style-type: none"> - <i>All PPs as displayed on the UNFCCC website</i> - <i>A correctly filled table as per the MR template</i> 	/MR/ /unfccc/	The verification team has checked section A.3 of the MR as well as the UNFCCC website and confirms that: <input checked="" type="checkbox"/> all PPs as displayed on the project related UNFCCC website are correctly listed <input checked="" type="checkbox"/> the table as per the template MR has been correctly filled In this context the following findings have been identified: N/A	OK	OK
A.4. Reference of applied methodology (F-CDM-FORM, Attachment, A.4) <i>Check if section A.4 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> - <i>Reference to the applicable version of the methodology</i> - <i>Reference to the applicable version(s) of relevant methodological tools</i> - <i>Relevant EB decisions, if applicable</i> 	/MR/ /PDD/ /unfccc/	The verification team has checked section A.4 of the MR and confirms by means of comparison with the information given in the PDD and displayed on the UNFCCC website that the information provided is complete and correct with regards to the following: <input checked="" type="checkbox"/> Number, title and version of the applicable CDM Methodology <input type="checkbox"/> Name and version of applicable CDM methodological tools <input checked="" type="checkbox"/> Relevant EB decisions In this context the following findings have been identified:	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		N/A		
A.5. Crediting period of project activity (F-CDM-FORM, Attachment, A.5) <i>Check if section A.5 of the MR correctly includes the following:</i> <ul style="list-style-type: none"> - <i>Start date of the crediting period. In this context please check, if applicable, whether post registration changes to the start date have been accepted by the EB.</i> - <i>Length and type of the crediting period</i> 	/MR/ /unfccc/	<p>The verification team has checked section A.5 of the MR and confirms by means of comparison with the information displayed on the UNFCCC website that the information provided is complete and correct with regards to the following:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Start date of the crediting period. <input checked="" type="checkbox"/> Type and length of the crediting period <p>In this context the following findings have been identified: N/A</p>	OK	OK
A.6. Publication of the Monitoring Report (VVS, § 243) <i>Check if the monitoring report has been made publicly available on the UNFCCC website before the verification commenced.</i> <i>Check if comments have been received and if yes, how they have been addressed.</i>	/unfccc/	<p>The verification team has ensured and confirms by means of checking the respective project information on the UNFCCC website that:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> The draft monitoring report, as received from the project participants, has been made publicly available prior to the start of the verification activities. <input checked="" type="checkbox"/> No comments have been received. <p>In this context the following findings have been identified: N/A</p>	OK	OK
A.7. Compliance with standardized format of the Monitoring Report (VVS, § 247 e) <i>Check (only) if the latest applicable MR template has</i>	/F-CDM-FORM/	<p>The verification team has checked all sections of the MR and confirms by means of comparison with the MR template that:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> the standardized MR template has been used 	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>been used. For compliance assessment with the MR guideline pl. refer to the respective MR sections.</i>		In this context the following findings have been identified: N/A		
B. Implementation of project activity				
B.1. Description of implemented registered project activity (F-CDM-FORM, Attachment, B.1) <i>Check if section B.1 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> - Implementation status of the PA - Detailed description of installed technology(ies) / technical processes and equipment applied - Diagrams (where appropriate) 	/MR/ /PDD/ /PS/ /IM01/	The verification team has checked section B.1 of the MR and confirms by means of comparison with the information given in the PDD, the project standard and information gathered during the site visit that: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> the description of the implementation status of the PA is in line with the applicable provisions of the project standard <input type="checkbox"/> an appropriate description of the installed technology(ies), technical process and equipment incl. diagrams, where applicable, has been included In this context the following findings have been identified: Although all equipment is the same since the implementation, their description is not correct. Thus CL B1 was raised: (CL B1) At Section B.1 of the MR, some data presented at tables 2 and 3 are not consistent with the ones evidenced during the site visit regarding the technical description of the installed equipment.	CL-B1	OK
B.1.1. Initial project implementation (VVS; §§ 260 a, 261) <i>Assess whether the project has been implemented</i>	/IM01/ /IM02/	<i>Description:</i> In the registered PDD, the technical features, equipment and monitoring procedures to be employed by the project activity are stated and the verification team could verify	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>and operated as per the registered PDD and are all physical features of the project in place?</i></p> <p><i>Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.</i></p> <p><i>Check if the project is still in compliance with the applicability conditions of the methodology.</i></p> <p><i>Also, discuss – if applicable – the necessity of PRC notifications / approvals.</i></p>	/PDD/	<p>that the project is indeed implemented with them.</p> <p>The SHPP Cristalino is composed by two turbo-generators of 2.0 MW of installed capacity (each).</p> <p><i>Verifier's action:</i> Performed interviews and compared the name plates of the equipment against the PDD to assess this issue.</p> <p><i>Conclusion:</i> The project has been implemented and operated as per registered PDD.</p>		
<p>B.1.2. Technical equipment changes (VVS; §§ 260 a, 261)</p> <p><i>Check if relevant technical equipment of the project activity has been exchanged or modified during the monitoring period. Further ensure that consistent notations of key equipment (meters etc.) in PDD, MR and calculation spreadsheet are applied</i></p> <p><i>Consider e.g. interviews with operational personnel, QMS records, maintenance records, instrument specifications.</i></p> <p><i>In case of changes, check whether the project is still in line with the registered PDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.</i></p> <p><i>In case of post registration changes pl. refer to</i></p>	<p>/IM01/ /IM02/ /PDD/ /MR/ /CAL/</p>	<p><i>Description:</i> At the registered PDD it is stated the technical features and equipment to be implemented at the project activity and the verification team verified during the site visit that the project is indeed implemented with them. There was no exchange of equipment in SHPP Cristalino during the MP.</p> <p><i>Verifier's action:</i> During the site visit, the verification team had a full overview of all installation, equipment and operation of the power plant. In addition, the verification team had accessed to the operational logbooks, calibration certificates^{/CAL/} and also performed interviews with the operational employees to counter check the information.</p> <p><i>Conclusion:</i> The equipment were observed and they are the same than the ones described in PDD and MR.</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>chapter B.2.</i>				
<p>B.1.3. Operation of the project activity (VVS; §§ 260 a, 261)</p> <p><i>Check if relevant operation modes of the project activity have been exchanged or modified during the monitoring period.</i></p> <p><i>Consider e.g. interviews with operational personnel, operation log sheets, data management system records.</i></p> <p><i>In case of changes, check whether the project is still in line with the registered PDD and assure that these changes have been considered in the monitoring report and the emission reduction calculation.</i></p> <p><i>In case of post registration changes pl. refer to chapter B.2.</i></p>	<p>/IM01/ /PDD/ /MAIN/ /GEN/ /OPER/</p>	<p><i>Description:</i> The mode of operation for the project activity have not been changed or modified during this 1st monitoring period.</p> <p><i>Verifier's action:</i> During the site visit, the verification team has interviewed the operation personnel and reviewed log sheets and data management records.</p> <p><i>Conclusion:</i> There are no changes in the mode of operation of the project activity during this monitoring period.</p>	OK	OK
<p>B.1.4. Incidents (VVS; §§ 260 a, 261)</p> <p><i>Identify if there have been any significant incidents, deviant operation modes and / or downtimes of the equipment?</i></p> <p><i>Consider e.g. interviews with operational personnel, operational log sheets, analysis of performance data.</i></p>	<p>/IM01/ /IM02/ /MR/ /MAIN/</p>	<p><i>Description:</i> All events and incidents are accordingly described in a report of events^{/MAIN/}. Programmed interruptions, regular cleaning interruptions and interruptions caused by hydrological problems have occurred, without significance and with no impact to the monitored generated energy. In addition, there were delays in the calibration of the meters for two periods that were also not reported.</p> <p>The information is missing at the MR, so CL B2 was raised.</p> <p><i>Verifier's action:</i> During the site visit, the verification team has</p>	CL-B2	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>interviewed the operation personnel and reviewed log sheets and data management records to confirm the information.</p> <p><i>Conclusion:</i></p> <p>(CL B2) It was verified during the site visit that there were events that caused downtimes of the operation that were not listed at Section B.1 of the MR.</p> <p>In addition, it was verified delays in the calibrations of the two meters that were also not reported.</p>		
<p>B.1.5. Legislation</p> <p><i>Find out – esp. in the context of methodological requirements - whether relevant legislation with effect on the project activity in the host country has been changed.</i></p> <p><i>Assess, in case of changes, whether consequences for the PA with regard to relevant CDM requirements have been accounted for.</i></p> <p><i>In case of changes data sources shall be referenced.</i></p>	/IM01/ /aneel/	<p><i>Description:</i> No relevant legislation from host country affecting the operations of the project activity has been changed.</p> <p><i>Verifier's action:</i> The verification team has reviewed the operational license and relevant legislation related to the project activity.</p> <p><i>Conclusion:</i> No changes have occurred.</p>	OK	OK
<p>B.1.6. Open issues from validation (VVS; § 248)</p> <p><i>Check (esp. in case of 1st periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR)?</i></p>	/VAL/	<p><input checked="" type="checkbox"/> There were no open issues addressed in the validation report</p> <p><input type="checkbox"/> All open issues from the validation have been appropriately addressed.</p> <p><input type="checkbox"/> The following issues related to the validation have not yet been appropriately addressed:</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
B.1.7. Open issues from previous verification (VVS; §§ 248, 319 h) <i>Check in case of further periodic verifications whether there are any open issues indicated in previous verification reports (FAR) and take into consideration the guidance as specified in VVS.</i>	/VER/	<input type="checkbox"/> There were no open issues addressed in the previous verification report <input type="checkbox"/> All open issues from the previous verification have been appropriately addressed. <input type="checkbox"/> The following issues related to the previous verification have not yet been appropriately addressed. <i>Not applicable as this is the 1st verification.</i>	N/A	N/A
B.2. Post registration changes				
B.2.1. Are post registration changes applicable to the proposed project activity?	/IM01/ /IM02/ /MR/	<input checked="" type="checkbox"/> No, by means of site visit, document check and interview it could be verified that the project is implemented and operated in line with the registered PDD and the applied methodology. (Please proceed with section C) <input type="checkbox"/> Yes, post registration changes have been identified and are assessed in detail in the subsequent steps. (Please proceed with B.2.2.). Nevertheless, as there is an information that there was a change at the project design included at the MR, CL B3 was raised for clarifications: (CL B3) The monitoring system verified on site was the use of the Emeter system reports as main source of generated electricity and CCEE reports (SINERCOM and CLIQCCEE) for cross-checking the generated electricity. The worksheets from	CL B3	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.						
		Grameyer system is used only for internal control of the operator. Thus, the actual situation of the monitoring system does not present a change to the system described at the registered PDD, contrary to indicated in Section B.2.4 of the MR.								
B.2.2. Temporary deviations from the registered monitoring plan or applied methodology (TDfrMP; TDfMM) (F-CDM-FORM, Attachment, B.2.1; VVS §§ 286 - 291) <i>Indicate whether any temporary deviations have been applied during this monitoring period.</i> <i>In cases where approval has been sought from the EB please provide reference.</i> <i>If applied, provide a description of the deviation(s).</i> <i>This should include the reasons for the deviation(s), how it deviates from the monitoring plan and/or applied methodology(ies), the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. Indicate if the deviation will lead to a reduction in the accuracy and if so, which conservative assumptions and discount factors have been applied.</i> <i>For deviation(s) that require prior approval by the Board, include the date of approval and reference number.</i>	/PS/ /unfccc/ /MR/ /PDD/	<table border="1"><tr><td><input type="checkbox"/></td><td>The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC</td></tr><tr><td><input checked="" type="checkbox"/></td><td>During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td></tr><tr><td><input type="checkbox"/></td><td>An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.</td></tr></table> In this context the following findings have been identified: N/A	<input type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC	<input checked="" type="checkbox"/>	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA	<input type="checkbox"/>	An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.	N/A	N/A
<input type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC									
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a TDfrMP or TDfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA									
<input type="checkbox"/>	An approval of the following TDfrMP or TDfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.									

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.							
B.2.3. Corrections (F-CDM-FORM, Attachment, B.2.2; VVS; §§ 292 - 294) <i>Indicate whether any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report.</i> <i>In cases where the correction(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i> <i>Please check and report that the corrected information is an accurate reflection of the actual project information and that the corrected parameters are in accordance with the applied methodology and the monitoring plan.</i>	/PS/ /unfccc/ /MR/ /PDD/	<table><tr><td rowspan="3"><input type="checkbox"/></td><td colspan="2">The following corrections have been applied:</td></tr><tr><td>1</td><td>Issue:</td></tr><tr><td>2</td><td>Issue:</td></tr></table> In this context the following findings have been identified: N/A	<input type="checkbox"/>	The following corrections have been applied:		1	Issue:	2	Issue:	N/A	N/A
<input type="checkbox"/>	The following corrections have been applied:										
	1	Issue:									
	2	Issue:									
B.2.4. Permanent changes from the registered monitoring plan or applied methodology (PCfrMP; PCfMM) (F-CDM-FORM, Attachment, B.2.3; VVS; §§ 295 - 303) <i>Indicate whether any permanent changes from the registered monitoring plan or applied methodologies have been approved during this monitoring period or submitted with this monitoring report.</i>	/PS/ /unfccc/ /MR/ /PDD/	<table><tr><td><input type="checkbox"/></td><td>The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC</td></tr><tr><td><input checked="" type="checkbox"/></td><td>During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td></tr><tr><td><input type="checkbox"/></td><td>An approval of the following PCfrMP or PCfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.</td></tr></table>	<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC	<input checked="" type="checkbox"/>	During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA	<input type="checkbox"/>	An approval of the following PCfrMP or PCfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.	N/A	N/A	
<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC										
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a PCfrMP or PCfMM has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA										
<input type="checkbox"/>	An approval of the following PCfrMP or PCfMM is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.										

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.								
<i>In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i>		In this context the following findings have been identified: N/A										
B.2.5. Changes to the project design of the registered project activity (CoPD) (F-CDM-FORM, Attachment, B.2.4; VVS; §§ 304 - 317) <i>Indicate whether any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring report.</i> <i>In cases where the change(s) and the revised PDD are approved prior to the submission of this monitoring report for request for issuance, provide the approval date and reference number. Otherwise, provide the version number and the completion date of the revised PDD.</i>	/PS/ /unfccc/ /MR/ /PDD/	<table><tr><td><input type="checkbox"/></td><td>The following CoPD has been approved or are under approval by the UNFCCC</td></tr><tr><td><input checked="" type="checkbox"/></td><td>During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA</td></tr><tr><td><input type="checkbox"/></td><td>An approval of the following CoPD.is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.</td></tr><tr><td><input type="checkbox"/></td><td>The following CoPD for which appendix 1 of the PS is applicable have been applied:</td></tr></table> Nevertheless, as there is an information that there was a change at the project design included at the MR, CL B3 was raised for clarifications In this context the following findings have been identified: Refer to CL B3 above at B.2.1.	<input type="checkbox"/>	The following CoPD has been approved or are under approval by the UNFCCC	<input checked="" type="checkbox"/>	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA	<input type="checkbox"/>	An approval of the following CoPD.is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.	<input type="checkbox"/>	The following CoPD for which appendix 1 of the PS is applicable have been applied:	CL B3	OK
<input type="checkbox"/>	The following CoPD has been approved or are under approval by the UNFCCC											
<input checked="" type="checkbox"/>	During the verification of the current MP no need for a CoPD has been identified. The monitoring plan is in accordance with the approved methodology applied by the PA											
<input type="checkbox"/>	An approval of the following CoPD.is to be requested from the EB for the current MP as appendix 1 of the project standard does not apply.											
<input type="checkbox"/>	The following CoPD for which appendix 1 of the PS is applicable have been applied:											
C. Description of monitoring system												

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.				
<p>C.1. Monitoring Plan – PDD Compliance (VVS, §§ 268-271)</p> <p><i>Check if the monitoring plan is in accordance with the monitoring plan contained in the registered PDD (or any accepted revised MP).</i></p> <p><i>Please check esp. if</i></p> <ul style="list-style-type: none">- <i>all parameters stated in the MP of the registered PDD have been monitored and updated as applicable</i>- <i>the monitoring equipment has been controlled and calibrated as per the MP</i>- <i>the monitoring results are consistently recorded as per the approved frequency</i>- <i>QA/QC procedures have been applied in accordance with the MP</i>	<p>/MR/ /PDD/</p>	<p>By means of comparison of the MR with the registered PDD (or any revisions thereof) the verification team has checked whether the MP is in compliance with the registered PDD. The outcome is as follows:</p> <table border="1"><tr><td><input checked="" type="checkbox"/></td><td>The MP is completely in accordance with the last registered/approved version of the PDD / MP.</td></tr></table> <p>In this context the following findings have been identified: N/A</p>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.	OK	OK		
<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.							
<p>C.2. Monitoring Plan – Meth Compliance (VVS, §§ 264-267)</p> <p><i>Check if the monitoring plan is in accordance with the applied methodology.</i></p> <p><i>In case the methodology references applicable tools it has to be ensured that the MP is also compliant with those tools.</i></p> <p><i>Also please specify if monitoring aspects have been identified that are not specified in the methodology</i></p>	<p>/MR/ /PDD/ /AMS/</p>	<p>By means of comparison of the MR with the applied CDM methodology and related tools the verification team has checked whether the MP is in compliance with the MP related requirements of the applied methodology. The outcome is as follows:</p> <table border="1"><tr><td><input checked="" type="checkbox"/></td><td>The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)</td></tr><tr><td><input type="checkbox"/></td><td>The MP is completely in accordance with the applied tools which the methodology references.</td></tr></table>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)	<input type="checkbox"/>	The MP is completely in accordance with the applied tools which the methodology references.	OK	OK
<input checked="" type="checkbox"/>	The MP is completely in accordance with the approved methodology applied by the CDM project (last registered/approved version of the PDD)							
<input type="checkbox"/>	The MP is completely in accordance with the applied tools which the methodology references.							

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>but may enhance the level of accuracy and completeness of the monitoring plan – this esp. applies for SSC PAs.</i>		<div></div> <p>In this context the following findings have been identified: N/A</p>		
<p>C.3. Management System (VVS, § 252 (a) (iii))</p> <p><i>Check if the GHG data monitoring system can be assessed as appropriate.</i></p> <p><i>In case reference is made to a (certified) company quality management system, check if all CDM related monitoring procedures have been fully integrated in the project participant's quality management system.</i></p> <p><i>In case of a stand-alone system, check how the GHG management system has been implemented and effectiveness is ensured.</i></p>	<p>/MR/ /IM01/ /IM02/ /MAIN/</p>	<p><i>Description:</i> The GHG data monitoring system does the measure and record the value of generated energy. There are two meters placed in substation Manoel Ribas where the energy is delivered. The meters are sealed to guarantee its safety after calibration.</p> <p>The monitoring and measurement system sends the information to CCEE and Cristalino Energia via cellular modem.</p> <p>CCEE reads the data through its system and compiles a report (SINERCOM and CLIQCCEE) which is made available to Cristalino through Electra Energy, company contracted to be the interface of Cristalino at CCEE. The company has the expertise to deal with all the information regarding generation of electricity and electricity market.</p> <p>By the other side, at the plant, the operator is responsible to handwriting the data directly from the Grameyer operation system to check any problem.</p> <p>In addition, the meters at Manoel Ribas Substation also provides data to the Emeter system (management system of the generated electricity data – Manufacturer: Vetorlog) which was purchased by Cristalino in order to provide a digital and robust cross-checking information.</p> <p>In the management system, information about data monitoring, quality control, data management, procedures and</p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p>authority/responsibilities is included.</p> <p>Moreover, a CDM Monitoring Manual has been prepared and all involved personnel have been trained to perform their duties.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals.</p> <p><i>Conclusion:</i> The GHG monitoring system can be assessed as appropriate. All CDM monitoring procedures have been fully integrated. It could be observed that the system has been implemented on site and its effectiveness is ensured by management personnel.</p>		
<p>C.4. Metering diagram (F-CDM-FORM, Attachment, C; PS §242)</p> <p><i>Check first if the MR includes a metering diagram showing all relevant monitoring points.</i></p> <p><i>Check further if this diagram reflects the actual situation and is in line with the registered PDD and with the requirements of the applied methodology.</i></p>	<p>/PS/ /MR/</p>	<p><i>Description:</i> No metering diagram has been included at Section C of the MR. Therefore, CL C4 has been raised.</p> <p><i>Verifier's action:</i> MR has been cross-checked against PDD and all meters were inspected during site visit.</p> <p><i>Conclusion:</i></p> <p>(CL C4) At Section C of the MR, it is missing a monitoring system diagram as per the "Instructions for filling out the monitoring report form".</p>	CL-C4	OK
C.5. Roles and Responsibilities	/IM01/	<p><i>Description:</i> The roles, positions and responsibilities are clearly</p>	CL-C5	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>(F-CDM-FORM, Attachment, C; PS §242)</p> <p><i>Check if all roles and positions of each person in the GHG data management process are clearly defined and implemented as stated in the monitoring plan. Please consider the complete data trail from raw data generation to submission of the final data.</i></p> <p><i>Identify, if relevant personnel w.r.t. monitoring has been exchanged?</i></p> <p><i>If so, have appropriate training measures been carried out.</i></p> <p><i>In case of changes, assure that the implemented monitoring procedures have not been affected.</i></p>	<p>/MR/ /PS/ /MAIN/ /TRAIN/</p>	<p>defined.</p> <p>Nevertheless, the organigram of the MR is not in accordance with the organigram presented at the registered. Thus, CL C5 was raised.</p> <p><i>Verifier's action:</i> During the site visit, the verification team checked the organizational chart and interviewed operational and managerial staff and observed that the roles and positions are clearly defined and implemented as stated in the monitoring plan.</p> <p>The involved personnel is properly trained and qualified for their tasks.</p> <p><i>Conclusion:</i></p> <p>(CL C5) The organigram presented at Section C of the MR is not in accordance with the organigram presented in the registered monitoring plan.</p>		
<p>C.6. Emergency procedures for the monitoring system</p> <p>(F-CDM-FORM, Attachment, C; PS §242)</p> <p><i>Check, as appropriate, whether relevant emergency procedures for the monitoring system have been included in the MR and assess whether these procedures have been implemented, when required</i></p>	<p>/PS/ /MR/ /IM01/ /MAIN/</p>	<p><i>Description:</i> The procedures in case of equipment failure or accidents are defined. There are backup procedures and reports set for emergency occasions. Nevertheless, they have not been described at the MR. Therefore, CL C6 was raised.</p> <p><i>Verifier's action:</i> The procedures could be checked by the verification team by means of interviews and review of log books and reports.</p>	CL-C6	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		<p><i>Conclusion:</i></p> <p>(CL C6) It was revealed during the site visit that there are emergency procedures for the monitoring system established by the operator. Nevertheless, they are missing at Section C of the MR.</p>		
<p>C.7. Data archive and data protection (PS §56 b)</p> <p>Check whether all records of monitoring parameters are archived according to the monitoring plan.</p> <p>Assess further whether appropriate measures have been taken in order to avoid unintended or intended manipulation or loss of the measured data.</p>	<p>/IM01/ /MR/</p>	<p><i>Description:</i> The data is measured hourly and recorded monthly. Spreadsheets are generated containing electricity dispatched to the grid. CCEE reports are made available and cross-checked with Emeter reports. After, these data are sent to Carbotrader (CDM consultant) and ER calculations are performed. The gathered data are kept for at least 2 years after last crediting period.</p> <p>Nevertheless, as the procedure has not been described at the MR, CL C7 was raised.</p> <p><i>Verifier's action:</i> During the site visit, the verification team could assess the procedures for data archive have been established and implemented by means of interviews and also retrieving data from the computer server on the biogas plant site.</p> <p><i>Conclusion:</i></p> <p>(CL C7) The procedures about data collection and data archive are missing at Section C of the MR.</p>	CL C7	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
D. Data and parameters				
D.1. Data and Parameters fixed ex ante				
a) Compliance with registered PDD (F-CDM-FORM, Attachment; D1, VVS § 246 (d)) <i>Check whether the value applied is in compliance with the registered PDD.</i>	/MR/ /PDD/	<p><i>Description:</i> The fixed parameter ex-ante is EF_{grid} which was calculated ex-ante using all ex-ante parameters of the registered PDD. The applied value is in compliance with the registered PDD.</p> <p><i>Verifier's action:</i> MR was cross-checked against the PDD.</p> <p><i>Conclusion:</i> The fixed parameter is in compliance with the registered PDD.</p>	OK	OK
b) Compliance with the applied methodology (F-CDM-FORM, Attachment; D1) <i>Check whether the value applied is in compliance with the applied methodology or any other tool.</i>	/AMS/ /PDD/	<p><i>Description:</i> The fixed parameter ex-ante is EF_{grid} and it is in accordance with the AMS-I.D.</p> <p><i>Verifier's action:</i> The PDD and MR were reviewed and cross-checked against the applied methodology.</p> <p><i>Conclusion:</i> The parameter fixed ex-ante is in accordance with the applied methodology.</p>	OK	OK
D.2. Data and Parameters monitored				

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
D.2.1. EG_y		<i>Parameter: Electricity generated by the renewable technology in the year y</i>		
<p>a) Measurement / Determination method (VVS, §§ 268, 271)</p> <p>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level (ODL) but also describe the applied data aggregation trails (from ODL to data aggregation level zero (DAL0)).</p> <p>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</p> <p>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</p>	/IM01/ /PDD/ /AMS/	<p><i>Description:</i> According to the MP, the parameter is the total amount of electricity monitored by SHPP Cristalino and electricity buyer delivered to the grid on the years 2008, 2009, 2010, 2011, 2012, 2013 and 2014 within the monitoring period. The parameter is continuously monitored by energy meters (main and back-up) at Manoel Ribas substation (grid delivery point), recorded every 15 minutes and monthly aggregated.</p> <p>No relevant equipment has been exchanged</p> <p><i>Verifier's action:</i> During the site visit the verification team had access to all equipment and data control system.</p> <p><i>Conclusion:</i> The monitoring of this parameter is in line with the registered MP of the PDD and with the applied methodology.</p>	OK	OK
<p>b) Accuracy and QA/QC Procedure (VVS, §§ 272-278)</p> <p>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have</p>	/CAL/ /MR/	<p><i>Description:</i> The data from the energy meters are cross checked with the CCEE reports in order to verify the consistency of the data. The data is monthly aggregated (electronic).</p> <p>Calibrations have not been carried out according to ONS requirements (2 years) and delays have been identified for two periods: from 2008-12-15 to 2009-05-13 and from 2013-05-10 to 2013-06-09. As the errors of the subsequent calibrations were smaller than the maximum permissible error determined by the manufacturer (0.2%) and according to the "Guidelines for</p>	CAR D8 CAR D9	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><i>been made for calculating ERs.</i></p> <p><i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i></p> <p><i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i></p>		<p>assessing compliance with the calibration frequency requirements" and in a conservative approach, the maximum permissible error was discounted in the calculation.</p> <p>Nevertheless, as the periods of delays have not been correctly defined, CAR D8 was raised.</p> <p>In addition, for some months, the generated electricity presented at the MR and used for the calculations are not the most conservative ones. Thus CAR D9 was raised.</p> <p><i>Verifier's action:</i> The calibration certificates^{/CAL/} and equipment manuals^{/MAIN/} have been presented to the verification team.</p> <p><i>Conclusion:</i></p> <p>(CAR D8) At the Excel spreadsheet, the values of generated electricity (EG_y) for the months of May/2009 and June/2013 are not correct as the periods used for the corrections of the maximum permissible error due to the calibration delays are not correct.</p> <p>(CAR D9) As verified during the site visit, some of the values of generated electricity presented at the MR and used for the calculations are not the most conservative ones among the values of CCEE reports and Emeter reports used for cross checking.</p> <p>Revise the calculations.</p>		

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>c) Correctness (VVS, §§ 268, 271)</p> <p><i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i></p> <p><i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>	<p>/MR/ /GEN/ /CAL/</p>	<p><input type="checkbox"/> Correct <input checked="" type="checkbox"/> Not correct (initial assessment)</p> <p><i>Description:</i> The generated energy of SHP Cristalino is not consistent with the company's database and CCEE reports. In addition, the periods of the calibration delays have to be revised. So, CAR D8 and CAR D9 were raised.</p> <p><i>Verifier's action:</i> All reports of energy generation and calibration certificates have been presented to the verification team and they were cross checked with CCEE reports.</p> <p><i>Conclusion:</i> Refer to CAR D8 and CAR D9 above.</p>	<p>CAR D8 CAR D9</p>	<p>OK</p>
D.3. Sampling				
<p>a) Implementation of sampling plan (F-CDM-FORM, Attachment; D3)</p> <p><i>Check whether the PP has applied a sampling approach to determine the monitored values (as per section D.2 above).</i></p> <p><i>If this is the case, please provide an assessment whether the PPs have correctly and sufficiently described the implemented sampling plan including</i></p> <p>a) Description of the implemented sampling design b) Collected data</p>	<p>/IM01/</p>	<p><input checked="" type="checkbox"/> No sampling approach has been used by the PP to determine the monitored parameters.</p>	<p>N/A</p>	<p>N/A</p>

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
c) <i>Analysis of collected data</i> d) <i>Demonstration on whether the required confidence/precision has been met.</i>				
b) Sampling during verification <i>In case the VT has applied a sampling approach in the course of the verification the approach shall be described for each parameter.</i>	/MR/	<input checked="" type="checkbox"/> No sampling approach has been used by the VT to verify the monitored parameters	N/A	N/A
E. Calculation of Emission reductions				
E.1. Traceability (VVS, §§ 247, 249) <i>Assess if the calculation is fully traceable. In case of complex calculations an Excel calculation spreadsheet shall be used. All applied formulae must be visible.</i>	/XLS/ /MR/	<i>Description:</i> The calculation spreadsheet provided by PP is clear and traceable. <i>Verifier's action:</i> Values presented in MR were reviewed against calculation spreadsheets. <i>Conclusion:</i> The calculation is fully traceable.	OK	OK
E.2. Parameter consistency (VVS, § 249) <i>Assess whether all internal and external parameters and data used for calculation are applied consistently in the monitoring report and the calculation spreadsheet?</i> <i>Consider only the correct data exchange between the</i>	/XLS/ /MR/ /GEN/	<i>Description:</i> The parameters used for the calculations are consistent. Nevertheless, as there is a mistake about the period of delay in the calibration of the meters and the conservativeness of data used, in order to assess this point, those issues have to be closed. <i>Verifier's action:</i> Values in calculation spreadsheet were cross-	CAR D8 CAR D9	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>monitoring report and the calculation spreadsheet (if any). Further ensure the consistency of notations for all parameters in the PDD, MR and calculation spreadsheet.</i>		checked against values from CCEE and Emeter. <i>Conclusion:</i> Refer to CAR D8 and CAR D9 above in D.2.1.		
E.3. Correctness of calculation (VVS, §§ 279-280) <i>Check if the applied formulae and methods for calculating baseline emissions, project emissions and leakage are in accordance with the monitoring plan and / or the approved methodology.</i> <i>Assess whether the provided calculations are complete and reflect all requirements of the monitoring plan.</i> <i>Check especially that no standard or old values have been used for calculation where calculations based on up-to-date data is required.</i>	/XLS/ /MR/ /GEN/	<i>Description:</i> The calculation procedures are correct. Nevertheless, as there is a mistake about the period of delay in the calibration of the meters and the conservativeness of data used, in order to assess this point, those issues have to be closed. <i>Verifier's action:</i> Values in calculation spreadsheet were cross-checked against values from CCEE and Emeter. <i>Conclusion:</i> Refer to CAR D8 and CAR D9 above in D.2.1.	CAR D8 CAR D9	OK
E.4. Emission reductions table (F-CDM-FORM, Attachment, E.4) <i>Check if the MR includes a summary table of the emission reductions calculation specifying separately</i> <ul style="list-style-type: none"> - Total baseline emissions - Total project emissions: - Total leakage 	/dna/ /MR/ /PDD/	<input checked="" type="checkbox"/> The MR includes in section E.4 a summary table of the emission reductions calculation. <input checked="" type="checkbox"/> The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately. <input type="checkbox"/> The values as specified in the ER summary table are correct; no issues have been identified during the	CAR D8 CAR D9	OK


Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>- <i>Total emission reductions.</i></p> <p><i>Assess whether the values are correct or need to be revised as a consequence of issues identified above.</i></p>		<p>verification which requires changes in the ER calculation.</p> <p><input checked="" type="checkbox"/> During the verification issues with impact on the ER calculation have been identified. Thus subject to the closure of above listed findings the summary table in E.4 needs to be revised.</p> <p>In this context the following additional findings have been identified:</p> <p>Refer to CAR D8 and CAR D9 above in D.2.1.</p>		
<p>E.5. Comparison with ex-ante determined emission reductions (F-CDM-FORM, Attachment, E.5; E.6)</p> <p><i>Check if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD.</i></p> <p><i>Check further whether in case of an increase an appropriate explanation is included in the MR.</i></p> <p><i>Assess in case of a significant increase whether this is due to technical or organizational changes within or outside the control of the PP and – if this is case – whether the PRC have been considered appropriately.</i></p>	<p>/XLS/ /MR/ /PDD/ /GEN/</p>	<p><i>Description:</i> The MR includes a comparison of actual values of the monitoring period with ex ante estimations in the registered PDD.</p> <p>There was a decrease in the ERs for the MP caused by a draught period.</p> <p><i>Verifier's action:</i> Calculation spreadsheet were reviewed against values presented in PDD, MR and generation reports.</p> <p><i>Conclusion:</i> There is a comparison and the slight decrease in the ERs is consistently justified.</p>	OK	OK
<p>E.6. ER during the 1st commitment period and the period from 1 January 2013 onwards</p>	<p>/MR/</p>	<p><input checked="" type="checkbox"/> The MR in section E.7 includes a summary table of the ER breakdown</p> <p>a) <i>ER up to 2012-12-31 and</i></p>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p>(F-CDM-FORM, Attachment, E.7)</p> <p>Check if the MR includes in chapter E.7 a breakdown of the actual ER into</p> <p>a) ER up to 2012-12-31 and</p> <p>b) ER from 2013-01-01 onwards</p> <p>The ERs for each period should be determined as per the actual generation. In cases where this is not possible or a cap has been applied a proportional (time related) approach should be chosen.</p>		<p>b) ER from 2013-01-01 onwards</p> <p><input checked="" type="checkbox"/> The breakdown of the ERs during the first commitment period and from 2013-01-01 onwards is as follows:</p> <p><input type="checkbox"/> The ER have completely been generated during the first commitment period</p> <p><input type="checkbox"/> The ERs have completely been generated from 2013-01-01 onwards,</p> <p><input checked="" type="checkbox"/> The ERs have partly been generated during the first commitment period and partly from 2013-01-01 onwards.</p> <p><input checked="" type="checkbox"/> The breakdown of the ERs is correct, considering the applicable guidance.</p> <p>In this context the following additional findings have been identified:</p> <p>N/A</p>		

ANNEX 2: CALIBRATION DATES AND VALIDITY OF INSTALLED MONITORING EQUIPMENT

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Calibration date	Validity of calibration	Delay in calibration	Period of delayed calibration
Main Meter	EG _y	504455	Saga 1000	0.2	2005-06-09	2007-06-08	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 2008-12-15 To: 2009-05-13 * the period from 2007-06-08 to 2008-12-14 is not covered by the MP.
					2009-05-14	2011-05-13		
					2011-05-10	2013-05-09		
					2013-06-10	2015-06-09		From: 2013-05-10 To: 2013-06-09
Backup Meter	EG _y	504456	Saga 1000	0.2	2005-06-09	2007-06-08	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	From: 2008-12-15 To: 2009-05-13 * the period from 2007-06-08 to 2008-12-14 is not covered by the MP.
					2009-05-14	2011-05-13		
					2011-05-10	2013-05-09		
					2013-06-10	2015-06-09		From: 2013-05-10 To: 2013-06-09

ANNEX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Sergio Cruz


SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2015-08-02
VCS / ISO 14064-2	Lead Assessor	2015-08-02

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies
13.1	Waste handling and disposal

185 – Rev. 2, Date: 2012-08-03

185_S01-F003_2012-08-03_rev3.doc S01-F003 rev2 / 2012-04-05



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Ricardo Lopes


SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2016-11-04
VCS / ISO 14064-2	Lead Assessor	2016-11-04

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable Energy	1.2.1 Hydro 1.2.2 Wind 1.2.4 Solar

077 – Rev. 3, Date: 2014-09-14

077_S01-VA000-F020_2014-09-14_rev3.doc S01-VA000-F020 rev3 / 2012-10-25



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Martin Saalman

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification)	2015-05-15
Ji	Technical Reviewer	2015-05-15
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2015-05-15

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable energies	1.2.4 Solar
13.1	Waste management and disposal	13.1.1 Waste management 13.1.2 Waste water management

022 – Rev. 4, Date: 2012-05-16

022_S01-F003_2012-05-16_rev4 S01-F003 rev2 / 2012-04-05