



# VERIFICATION AND CERTIFICATION REPORT

- 1ST PERIODIC -

PACIFIC HYDRO CHACAYES S.A.

CHACAYES HYDROELECTRIC  
PROJECT, CHILE

UNFCCC REF. No. : 6848

Monitoring Period: 2012-07-30 to 2013-07-29  
(incl. both days)

**Report No: 10343 – 14/011**

**Date: 2014-05-21**

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<b>Verification Report:</b>	<b>Report No.</b>		<b>Rev. No.</b>	<b>Date of 1<sup>st</sup> issue:</b>	<b>Date of this rev.</b>
	10343 – 14/011		0	2014-05-21	2014-05-21
<b>Project:</b>	<b>Title:</b>			<b>Registration date:</b>	<b>UNFCCC-No.:</b>
	Chacayes Hydroelectric Project, Chile			2012-07-26	6848
				<b>Verification No.:</b>	
				1 <sup>st</sup> periodic verification	
	<b>Crediting period:</b>			<b>From:</b>	<b>To:</b>
	<input checked="" type="checkbox"/> Renewable (7y) <input type="checkbox"/> Fixed (10y)			2012-07-30	2019-07-29
<b>Project Scale:</b>					
<input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale					
<b>Project Participant(s):</b>	<b>Client:</b>				
	Pacific Hydro Chacayes S.A.				
	<b>Non Annex 1 country:</b>			<b>Annex 1 country:</b>	
	Chile			-	
	<b>PP from non-Annex 1 country:</b>			<b>PP from Annex 1 country:</b>	
Pacific Hydro Chacayes S.A. (PHCSA)			-		
<b>Applied methodology/ies:</b>	<b>Title:</b>			<b>No.:</b>	<b>Scope(s) / TA(s)</b>
	Consolidated baseline methodology for grid-connected electricity generation from renewable sources			ACM0002 ver. 13.0.0	1 / 1.2
<b>Monitoring period and monitoring report</b>	<b>Monitoring period (MP):</b>			<b>Monitoring Report:</b>	
	<b>From:</b>	<b>To:</b>	<b>No. of days:</b>	<b>Draft version:</b>	<b>Final version:</b>
	2012-07-30	2013-07-29	365	2013-12-12	2014-05-20
<b>Verification team / Technical Review and Final Approval:</b>	<b>Verification Team:</b>			<b>Technical review:</b>	<b>Final approval:</b>
	Sergio Cruz Marcelo Sebben			Dr. Jochen Schubert	Dr. Jochen Schubert
<b>Key dates of verification:</b>	<b>Publication of MR :</b>		<b>DVerR issued:</b>	<b>On-site (from):</b>	<b>On-site (to):</b>
	2014-01-24		2014-03-07	2014-03-05	2014-03-07
<b>Summary of Verification opinion</b>	Pacific Hydro Chacayes S.A. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: "Chacayes Hydroelectric Project, Chile", 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"> <li><input checked="" type="checkbox"/> all operations of the project are implemented and installed as planned and described in the validated project design document,</li> <li><input checked="" type="checkbox"/> the monitoring plan is in accordance with the applied approved CDM methodology,</li> <li><input checked="" type="checkbox"/> the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately,</li> <li><input checked="" type="checkbox"/> the monitoring system is in place and functional. The project has generated GHG emission reductions, and</li> <li><input checked="" type="checkbox"/> the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner.</li> </ul> <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>				
<b>Emission reductions: [t CO<sub>2</sub>e]</b>	<b>Total verified amount</b>			<b>As per draft MR:</b>	<b>As per PDD:</b>
	318,953			318,953	357,011 /a
				<b>ER achieved up to</b>	<b>ER achieved from</b>



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		<b>2012-12-31</b>	<b>2013-01-01</b>
		153,657	165,296
<b>Document information:</b>	<i>Filename:</i>	<i>No. of pages:</i>	
	2014-05-21_FVerRep_Chacayes clean.docx	68	

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## Abbreviations:

<b>CA</b>	<b>Corrective Action / Clarification Action</b>
<b>CAR</b>	<b>Corrective Action Request</b>
<b>CDEC-SIC</b>	<b>Load Economic Dispatch Center of the Central Interconnected System</b>
<b>CDM</b>	<b>Clean Development Mechanism</b>
<b>CER</b>	<b>Certified Emission Reduction</b>
<b>CO<sub>2</sub></b>	<b>Carbon dioxide</b>
<b>CO<sub>2</sub>e</b>	<b>Carbon dioxide equivalent</b>
<b>CL</b>	<b>Clarification Request</b>
<b>DVerR</b>	<b>Draft Verification Report</b>
<b>ER</b>	<b>Emission Reduction</b>
<b>FAR</b>	<b>Forward Action Request</b>
<b>GHG</b>	<b>Greenhouse gas(es)</b>
<b>MP</b>	<b>Monitoring Plan</b>
<b>MR</b>	<b>Monitoring Report</b>
<b>PA</b>	<b>Project Activity</b>
<b>PDD</b>	<b>Project Design Document</b>
<b>PP</b>	<b>Project Participant</b>
<b>QA/QC</b>	<b>Quality Assurance / Quality Control</b>
<b>UNFCCC</b>	<b>United Nations Framework Convention on Climate Change</b>
<b>VVS</b>	<b>Validation and Verification Standard</b>
<b>XLS</b>	<b>Emission Reduction Calculation Spread Sheet</b>

<b>Table of Contents</b>	<b>Page</b>
1. INTRODUCTION .....	7
1.1. Objective	7
1.2. Scope	7
2. GHG PROJECT DESCRIPTION.....	9
2.1. Technical Project Description	9
2.2. Project Location	9
2.3. Project Verification History	10
3. METHODOLOGY AND VERIFICATION SEQUENCE .....	11
3.1. Verification Steps	11
3.2. Contract review	11
3.3. Appointment of team members and technical reviewers	11
3.4. Publication of the Monitoring Report	12
3.5. Verification Planning	12
3.6. Desk review	14
3.7. On-site assessment	15
3.8. Draft verification reporting	16
3.9. Resolution of CARs, CLs and FARs	16
3.10. Final reporting	17
3.11. Technical review	17
3.12. Final approval	17
4. VERIFICATION FINDINGS.....	18
5. SUMMARY OF VERIFICATION ASSESSMENTS.....	24
5.1. Involved Parties and Project Participants	24
5.2. Implementation of the project	24
5.3. Project history	24
5.4. Post registration changes	24
5.5. Compliance with the monitoring plan	25
5.6. Compliance with the monitoring methodology	25
5.7. Monitoring parameters	25
5.8. Monitoring report	25
5.9. Sampling	26
5.9.1. Implementation of the sampling plan	26
5.9.2. Sampling approaches during verification	26



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5.10.	ER Calculation	26
5.11.	Quality Management	26
5.12.	Actual emission reductions during the first commitment period and the period from 1 January 2013 onwards	26
5.13.	Comparison with ex-ante estimated emission reductions	27
5.14.	Overall Aspects of the Verification	27
5.15.	Hints for next periodic Verification	27
6.	VERIFICATION AND CERTIFICATION STATEMENT .....	28
7.	REFERENCES .....	29
	ANNEX 1: VERIFICATION PROTOCOL .....	35
	ANNEX 2: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL .....	68



## 1. INTRODUCTION

Pacific Hydro Chacayes S.A. has commissioned the TÜV NORD JI/CDM Certification Program (CP) to carry out the 1st periodic verification of the project

“Chacayes Hydroelectric Project, Chile”

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<sup>/VVS/</sup> 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<sup>/PDD/</sup>, the monitoring report<sup>/MR/</sup>, emission reduction calculation spread sheet<sup>/XLS/</sup>, 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<sup>/KP/</sup>,
- guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1<sup>/MA/</sup>, and subsequent decisions made by the Executive Board and COP/MOP,
- other relevant rules, including the host country legislation,



- 
- CDM Validation and Verification Standard<sup>/VVS/</sup>
  - monitoring plan as given in the registered PDD<sup>/PDD/</sup>,
  - Approved CDM Methodology.



## 2. GHG PROJECT DESCRIPTION

### 2.1. Technical Project Description

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

**Table 2-1:** Technical data of the project activity

Parameter	Unit	Value
Total Installed Capacity	MW	110.8
<b><u>Turbine</u></b>		
Type		Francis, vertical shaft
Quantity		2
		# 1 – Serial 2142
		# 2 – Serial 2143
Capacity (per unit)	MW	56.68
<b><u>Generator</u></b>		
Type		Three-phase synchronous
Quantity		2
		# 1 – Serial 1.660.311
		# 2 – Serial 1.660.312
Capacity (per unit)	kVA	65,600
Power factor		0.9

### 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	Chile
Region:	6 <sup>th</sup> Region
Project location address:	Coya town
Latitude:	34° 16' 31.54" S
Longitude:	70° 27' 8.76" W



## 2.3. Project Verification History

Essential events since the registration of the project are presented in the following Table 2-3.

**Table 2-3:** Status of previous Monitoring Periods

#	Item	Time	Status
1	1 <sup>st</sup> Monitoring period	2012-07-30 to 2013-07-29	Awaiting Issuance Request

An overview of all Post Registration Changes is given in the following table.

N/A

### 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<sup>MR/</sup> submitted by the client and additional supporting documents with the use of customized verification protocol<sup>CPM/</sup> according to the Validation and Verification Standard<sup>VVS/</sup>;
- 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 <sup>1)</sup>	Qualification Status <sup>2)</sup>	Scheme Competence <sup>3)</sup>	Technical Competence <sup>4)</sup>	Verification Competence <sup>5)</sup>	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sergio Cruz	BRTÜV	TL <sup>A)</sup>	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.	Marcelo Sebben	BRTÜV	TM <sup>A)</sup>	A	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Dr. Jochen Schubert	TÜV NORD, Germany	TR <sup>B)</sup> FA <sup>B)</sup>	SA	<input checked="" type="checkbox"/>	1.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

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

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

<sup>3)</sup> GHG auditor status (at least Assessor)

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

<sup>5)</sup> In case of verification projects

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

<sup>B)</sup> 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

<b>Table A-1: GHG calculation procedures and management control testing / Detailed audit testing of residual risk areas and random testing</b>				
<b>Identification of potential reporting risk</b>	<b>Identification, assessment and testing of management controls</b>	<b>Areas of residual risks</b>	<b>Additional verification testing performed</b>	<b>Conclusions and Areas Requiring Improvement (including Forward Action Requests)</b>
<i>The following potential risks were identified and divided and structured according to the possible areas of occurrence.</i>	<i>The potential risks of raw data generation have been identified in the course of the monitoring system implementation. The following measures were taken in order to minimize the corresponding risks. The following measures are implemented:</i>	<i>Despite the measures implemented in order to reduce the occurrence probability the following residual risks remain and have to be addressed in the course of every verification.</i>	<i>The additional verification testing performed is described. Testing may include:</i> <ul style="list-style-type: none"> <li>- Sample cross checking of manual transfers of data</li> <li>- Recalculation</li> <li>- Spreadsheet 'walk throughs' to check links and equations</li> <li>- Inspection of calibration and maintenance records for key equipment</li> <li>- Check sampling analysis results</li> </ul> <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

<b>Table A-2: Periodic verification checklist</b>				
<b>Checklist Item</b>	<b>Reference</b>	<b>Verification Team Comments</b>	<b>Draft Conclusion</b>	<b>Final Conclusion</b>
<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<sup>/PDD/</sup>,
- the last revision of the validation report<sup>/VAL/</sup>,
- documentation of previous verifications<sup>/VER/</sup>
- the monitoring report, including the claimed emission reductions for the project<sup>/MR/</sup>,
- the emission reduction calculation spreadsheet<sup>/XLS/</sup>.



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 Pacific Hydro Chacayes S.A. (PHCSA) and Poch Ambiental S.A. (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
1. Projects & Operations Personnel 2. Consultant	<ul style="list-style-type: none"> <li>- General aspects of the project</li> <li>- Technical equipment and operation</li> <li>- Changes since validation / previous verification</li> <li>- Monitoring and measurement equipment</li> <li>- Remaining issues from validation/ previous verification</li> <li>- Calibration procedures</li> <li>- Quality management system</li> <li>- Involved personnel and responsibilities</li> <li>- Training and practice of the operational personnel</li> <li>- Implementation of the monitoring plan</li> <li>- Monitoring data management</li> <li>- Data uncertainty and residual risks</li> <li>- GHG emission reduction calculation</li> <li>- Procedural aspects of the verification</li> <li>- Maintenance</li> <li>- Environmental aspects</li> </ul>

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<sup>/MR/</sup>, the calculation spreadsheet<sup>/XLS/</sup>, PDD<sup>/PDD/</sup>, the Validation Report<sup>/VAL/</sup> 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	1	0	0
B – Implementation of project activity	0	1	0
C – Description of monitoring system	0	0	0
D – Data and parameters	1	2	0
E - Calculation of Emission Reductions	1	0	0
<b>SUM</b>	<b>3</b>	<b>3</b>	<b>0</b>

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	A1		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The last version of the MR template available at UNFCCC website has not been used. Associated checklist question(s): A.7		
<b>Corrective Action #1</b> <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 version of the template was updated to 03.2 in the new version of the MR.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s):	New version No.: 2
	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues in annex</i>	The last version of MR template available (03.2) has now been used.		



Finding	A1
A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	<b>CAR is closed</b>
<b>Conclusion</b> 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	B2								
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR						
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The Corrections to the project activity referred at Section B.2.2 of the MR have to be better explained.  As revealed during the site visit, no metering points are being changed; no change in a method of data collection has happened; neither a change at the management structure.  Associated checklist question(s): B.2.3								
<b>Corrective Action #1</b> <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>	During the verification visit it was verified that there is no effective changes or corrections in the monitoring plan. Therefore in the new version of the MR, section B.2.2 was updated considering no corrections. And also section C was updated to better explain the monitoring system according to the description of the registered PDD.  <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input checked="" type="checkbox"/> Changes in MR</td> <td>Section(s): B.2.2; C</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.2.2; C	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.2.2; C	New version No.: 2							
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:							
<b>DOE Assessment #1</b> <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>	Clarifications to the monitoring plan have been included at Section C to make it easier the understanding of the whole system. The described monitoring plan reflects the scenario verified during the site visit and it is the same as set at the registered PDD, but better explained.  In this way, no corrections to the registered monitoring plan have been identified to be requested.  Nevertheless, some clarifications are still missing: <ol style="list-style-type: none"> <li>1. According to Figure B3 of the registered PDD, the emission reduction is directly measured at metering point M1 and M2. As the ER of the recent monitoring period is based on meter reading of meter M5 and M6;</li> <li>2. It should be clarified if only electricity from the project activity is delivered to the substations.</li> </ol> <p><b>CL remains open</b></p>								



Finding	B2								
<p><b>Corrective Action #2</b>  <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>	<p>1. The PP wants to clarify that net energy is in fact measured at metering points M5 and M6. According to the CDM methodology, energy supplied to the grid should be measured at the injection point (net generation). Therefore, data from M5 and M6 must be used for ER estimation. Meters M1 and M2 are not used for CDM monitoring purposes, as they measure gross electricity generation. They are presented in the diagram because they actually exist, and they might be used in a very exceptional case of a failure of M5 and M6.</p> <p>2. Meters M5 and M6 measure electricity generation only from the project activity, even though Sauzal substation receives energy from other plant (Sauzal plant). Therefore, it is important to highlight that the energy generated by Sauzal plant is not related with the project, and is not measured by M5 and M6.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;"><input checked="" type="checkbox"/></td> <td style="width: 20%;">Changes in MR</td> <td style="width: 30%;">Section(s): B.2.2; C</td> <td style="width: 30%;">New version No.: 3</td> </tr> <tr> <td><input type="checkbox"/></td> <td>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.2.2; C	New version No.: 3	<input type="checkbox"/>	Changes in XLS	Worksheet(s):	New version No.:
<input checked="" type="checkbox"/>	Changes in MR	Section(s): B.2.2; C	New version No.: 3						
<input type="checkbox"/>	Changes in XLS	Worksheet(s):	New version No.:						
<p><b>DOE Assessment #2</b>  <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>	<p>1. The PP is reporting the situation that was actually seen during the site visit. Although meters M1 and M2 appear at the diagram of the registered PDD as they are located at the Chacayes plant, they measure the generated electricity of the plant, not the net delivered electricity, therefore not having a role at the CDM monitoring. This measurement can be assessed as conservative.</p> <p>2. By the other hand, the meters that measure Chacayes' net electricity delivered to the grid are meters M5 and M6, located at Sauzal Substation. At this Sauzal substation, also the electricity from Sauzal plant is delivered. By means of site visit and document check it can be confirmed that the meters M5 and M6 measures only the electricity generated from the project activity.</p> <p><b><u>CL is closed</u></b></p>								
<p><b>Conclusion</b>  <i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>								

Finding	D3		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Parameters Cap <sub>BL</sub> and A <sub>BL</sub> are missing at Section D.2 of the MR. Associated checklist question(s): D.1		



Finding	D3		
<b>Corrective Action #1</b> <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>	In the new version of the MR parameters Cap <sub>BL</sub> and A <sub>BL</sub> were included in section D.1.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): D.1	New version No.: 2
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:	
<b>DOE Assessment #1</b> <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>	Parameters Cap <sub>BL</sub> and A <sub>BL</sub> have been included at Section D.1 of the MR as per the validated PD <sup>/PDD/VCS-PD/</sup> .		
	<b><u>CL is closed</u></b>		
<b>Conclusion</b> <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	D4		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The value of the monitored parameter EG <sub>facility,y</sub> presented at Section D.2 is not the most conservative one and therefore is not consistent with the one used for the ER calculations presented at Section E.1.		
	Associated checklist question(s): D.2.1		
<b>Corrective Action #1</b> <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>	In the new version of the MR, in section D.2 the parameter EG <sub>facility,y</sub> considers the most conservative value according to the values presented in section E.1.		
	<input checked="" type="checkbox"/> Changes in MR	Section(s): D.2	New version No.: 2
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:	
<b>DOE Assessment #1</b> <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 value of the monitored parameter EG <sub>facility,y</sub> has been corrected and it is now the most conservative one as per the presented evidences and it is now consistent with the one used for the ER calculations presented at Section E.1.		
	<b><u>CAR is closed</u></b>		
<b>Conclusion</b> <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	D5		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b>	The monitoring parameter A <sub>PJ</sub> (Area of the single reservoir		



Finding	D5						
<p><i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) should be measured by an annual topographic survey, as per the registered PDD.</p> <p>Nevertheless, the project activity has started commercial operations on 2011-12-31 and only one topographic survey has been presented to the verification team.</p> <p>Associated checklist question(s): D.2.3</p>						
<p><b>Corrective Action #1</b> <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>	<p>A Report covering the monthly monitoring of the reservoir from June to December of 2012 has been prepared and provided to the DOE.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input checked="" type="checkbox"/> Changes in MR</td> <td>Section(s): D.2</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): D.2	New version No.: 2	<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:
<input checked="" type="checkbox"/> Changes in MR	Section(s): D.2	New version No.: 2					
<input type="checkbox"/> Changes in XLS	Worksheet(s):	New version No.:					
<p><b>DOE Assessment #1</b> <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>	<p>In addition to the Topographic survey of the reservoir of 2013 previously presented, the PP has now presented a Report with the monthly monitoring of the reservoir area from June to December of 2012.</p> <p>The Report was verified. The monitored values of the reservoir area as per both studies are 176,700 (December 2012) and 186,473 (August 2013) and can be assessed as plausible. The reservoir area has no impact on the project emissions as the calculation of the power density shows value much greater than 10 W/m<sup>2</sup></p> <p><b><u>CL is closed</u></b></p>						
<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>						

Finding	E6						
<p><b>Classification</b></p>	<p><input checked="" type="checkbox"/> CAR      <input type="checkbox"/> CL      <input type="checkbox"/> FAR</p>						
<p><b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>The figures used for the generated energy are not the most conservative as they shall be rounded down.</p> <p>The respective ER calculations shall be revised at Section E.1.</p> <p>Associated checklist question(s): E.3; E.4; E.5</p>						
<p><b>Corrective Action #1</b> <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>	<p>In the new version of the MR, at section E.1 the electricity monitored values and the invoice report values were rounded down. The spreadsheet "CDM ER calculation" was also updated.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input checked="" type="checkbox"/> Changes in MR</td> <td>Section(s): E.1</td> <td>New version No.: 2</td> </tr> <tr> <td><input checked="" type="checkbox"/> Changes in XLS</td> <td>Worksheet(s): CDM ER</td> <td>New version No.: 2</td> </tr> </table>	<input checked="" type="checkbox"/> Changes in MR	Section(s): E.1	New version No.: 2	<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): CDM ER	New version No.: 2
<input checked="" type="checkbox"/> Changes in MR	Section(s): E.1	New version No.: 2					
<input checked="" type="checkbox"/> Changes in XLS	Worksheet(s): CDM ER	New version No.: 2					



Finding	E6	
	calculation v.2 12.03.2014	
<p><b>DOE Assessment #1</b>  <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>	<p>The values presented for the generated energy are now the most conservative ones and they have been rounded down.                      These new values are the ones used for the ER calculations.  <b><u>CAR is closed</u></b></p>	
<p><b>Conclusion</b>  <i>Tick the appropriate checkbox</i></p>	<p><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</p>	



## 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	Chile	Pacific Hydro Chacayes S.A. (PHCSA)

### 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.

### 5.3. Project history

The project activity was registered as a CDM project on 2012-07-26 (reference number 6448), and the commercial operation of the plant has started on 2011-12-31.

The present verification is related to the 1<sup>st</sup> monitoring period (2012-07-30 to 2013-07-29 – both days included) from the first crediting period.

During the validation, all raised issues have been closed or resolved during the validation stage. For this purpose, no FAR has been raised.

Furthermore as this is the 1<sup>st</sup> periodic verification no issues from former verifications are to be considered.

### 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 monitoring plan described at the MR reflects the scenario verified during the site visit and it is the same as set at the registered PDD, but better explained and thus clearer.

The calibrations of the meters are up to date and the accuracy of 0.2% is in accordance with the registered monitoring plan and local electric sector practices. The accuracy can be confirmed by means of document review and sit visit. Nevertheless it is necessary to clarify a situation: although meters M1 and M2 appear at the diagram of the registered PDD as they are located at the Chacayes plant, they measure the generated electricity of the plant, not the net delivered electricity, therefore not having a role at the CDM monitoring. By the other hand, the meters that measure Chacayes' net electricity delivered to the grid are meters M5 and M6, located at Sauzal Substation. This measurement can be assessed as conservative. At the Sauzal substation, also the electricity from Sauzal plant is delivered. Nevertheless, meters M5 and M6 only measures the electricity generated from Chacayes project. This could be verified during the site visit.

## **5.6. Compliance with the monitoring methodology**

The monitoring system is in compliance with the applied monitoring methodology (ACM0002 version 13.0.0).

## **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.

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.

## **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.

## 5.9. Sampling

### 5.9.1. Implementation of the sampling plan

No sampling was required to determine the monitored parameters.

### 5.9.2. Sampling approaches during verification

No sampling approaches were taken during the verification.

## 5.10. 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.

## 5.11. 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.

## 5.12. 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 <sup>1)</sup>	from 2013-01-01 <sup>1)</sup>	Sum
Emission reductions [tCO <sub>2</sub> e]	153,657	165,296	318,953

<sup>1)</sup> Both days included



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### **5.13. 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.

### **5.14. 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).

### **5.15. Hints for next periodic Verification**

Not applicable.



## 6. VERIFICATION AND CERTIFICATION STATEMENT

Pacific Hydro Chacayes S.A. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: “Chacayes Hydroelectric Project, Chile”, with regard to the relevant requirements for CDM project activities. The project reduces GHG emissions due to the generation of electricity from renewable hydroelectric sources and replacing thermal generation from fossil fuels that would be dispatched to the system. This verification covers the period from 2012-07-30 to 2013-07-29 (including both days).

In the course of the verification 3 Corrective Action Requests (CARs) and 3 Clarification Requests (CLs) 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., ACM0002 ver. 13.0.0
- 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 1<sup>st</sup> periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions: **318,953** t CO<sub>2</sub>e

São Paulo, 2014-05-21

Sergio Cruz

TÜV NORD JI/CDM Certification Program  
Verification Team Leader

Essen, 2014-05-21

Dr. Jochen Schubert

TÜV NORD JI/CDM Certification Program  
Final Approval



## 7. REFERENCES

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

Reference	Document
/CAL/	<p>Calibration Certificates:</p> <ul style="list-style-type: none"> <li>- M5 (Serial # 112416378):                             <ul style="list-style-type: none"> <li>o EN201107000002 – issued by CAM Chile S.A. – 2011-07-05</li> <li>o PH201304000001 – issued by CAM Chile S.A. – 2013-04-13</li> </ul> </li> <li>- M6 (Serial # 112416380):                             <ul style="list-style-type: none"> <li>o EN201107000003 – issued by CAM Chile S.A. – 2011-07-08</li> <li>o PH201304000002 – issued by CAM Chile S.A. – 2013-04-13</li> </ul> </li> <li>- M1 (Serial # MI-1002A422-02):                             <ul style="list-style-type: none"> <li>o 2011TS054 – issued by Tecnet S.A. – 2011-08-23</li> </ul> </li> <li>- M2 (Serial # MI-1002A425-02):                             <ul style="list-style-type: none"> <li>o 2011TS055 – issued by Tecnet S.A. – 2011-08-23</li> </ul> </li> </ul>
/GEN/	<p><u>Generated Energy:</u></p> <ul style="list-style-type: none"> <li>- Monthly Reports of Active Energy of Chacayes (internal Excel file) – Pacific Hydro</li> <li>- Monthly Billing Inform Reports – CDEC-SIC</li> </ul>
/LIC/	<p>Municipal License # 1487/1128 – Municipalidad de Machalí – valid until 2014-07-31</p>
/MAN/	<p><u>Equipment, Operation and Management Manuals and Procedures and Maintenance Reports:</u></p> <ul style="list-style-type: none"> <li>- Preliminary inform of failures (incident operational reports)</li> <li>- Electronic request of disconnection /intervention to CDEC-SIC</li> <li>- Operational manual – 11 Procedures – Pacific Hydro</li> <li>- Training:                             <ul style="list-style-type: none"> <li>o Plant operators</li> <li>o CDM requirements for involved personnel (attendance list and Presentation of CDM requirements – POCH – 2013-08-21)</li> </ul> </li> </ul>



Reference	Document
	<ul style="list-style-type: none"> <li>- Emergency Operational manual – Pacific Hydro</li> </ul>
<b>/MR/</b>	<p>Monitoring Report “Chacayes Hydroelectric Project, Chile –Monitoring Period 1 –2011-07-30 to 2013-07-29 (both days included)</p> <ul style="list-style-type: none"> <li>- version 1 – 2013-12-12</li> <li>- version 2 – 2014-03-12</li> <li>- version 3 – 2014-04-29</li> <li>- version 4 – 2014-05-20</li> </ul>
<b>/RES/</b>	<p><u>Reservoir area:</u></p> <ul style="list-style-type: none"> <li>- Report of the Monthly Monitoring of the Reservoir Area from June to December 2012 – Pacific Hydro Chile S.A. – 2014-05-19</li> <li>- Topographic survey of the reservoir – Pacific Hydro Chile S.A. – 2013-08-23</li> </ul>
<b>/TRAIN/</b>	<p>Hydroelectric Operational Capacitation Training Certificates – Capacitaciones ACTICAP Chile:</p> <p>Certificate #1110017 – Mario Aránguiz Ahumada – 2011-10-14</p> <p>Certificate #1110018 – John Osses Torres – 2011-10-14</p> <p>Certificate #1110019 – Julio González Guajardo – 2011-10-14</p> <p>Certificate #1110020 – Jonathan Espinoza Morales – 2011-10-14</p> <p>Certificate #1110021 – Philippe Gouet Bórquez – 2011-10-14</p>
<b>/XLS/</b>	Excel spreadsheets calculations

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

Reference	Document
<b>/ACM02/</b>	ACM0002 ver. 13.0.0 – Consolidated baseline methodology for grid-connected electricity generation from renewable sources
<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)

Reference	Document
/GLMP/	Guidelines: Completing the monitoring report form (EB 75, Annex 7)
/IPCC/	<ol style="list-style-type: none"> <li>1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book</li> <li>2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book</li> </ol>
/KP/	Kyoto Protocol (1997)
/MA/	Decision 3/CMP. 1 (Marrakesh – Accords)
/MRT/	Monitoring Report Form (F-CDM-MR), Version 03.2
/MT/	<ul style="list-style-type: none"> <li>- “Tool for the demonstration and assessment of additionality” – Version 5.2.1</li> <li>- “Tool to calculate the emission factor for an electricity system” – Version 02.2.1</li> </ul>
/PDD/	Project Design Document for CDM project: “Chacayes Hydroelectric Project, Chile” – version 4.4 – 2012-07-17
/PS/	CDM Project Standard (Version 5.0)
/VAL/	Validation Report for CDM project “Chacayes Hydroelectric Project, Chile” rev. 02 – DNV – 2012-07-24
/VER/	Documents of previous verifications (Monitoring report, verification report, ER calculation sheet)
/VVS/	CDM Validation and Verification Standard (Version 05.0)

**Table 7-3:** Websites used

Reference	Link	Organization
/cdec-sic/	<a href="http://www.cdec-sic.cl">www.cdec-sic.cl</a>	Load Economic Dispatch Center of the Central Interconnected System – <i>Centro de Despacho Económico de Carga del Sistema Interconectado Central</i>



Reference	Link	Organization
/dna/	www.mma.gob.cl/1304/w3-channel.html	DNA of Chile
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications

**Table 7-4:** List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organization / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Mauricio Raby	Pacific Hydro / Head of Commercial Contracts
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sebastián Fehlandt	Pacific Hydro / Commercial Contracts Engineer
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Victor Cisternas	Pacific Hydro / Head of Operations
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Natalia Tobar	POCH / Consultant
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Carolina Urmeneta	POCH / Consultant

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)



# ANNEX

- A1:** Verification Protocol
- A2:** Statements of Competence of  
involved Personnel

1st Periodic Verification and Certification Report: Chacayes Hydroelectric  
Project, Chile

TÜV NORD JI/CDM Certification Program

R-No: 10343 – 14/011

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



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



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"> <li>Limited access to IT systems</li> <li>Data protection procedures</li> </ul>	<ul style="list-style-type: none"> <li>Unintended change of spread sheet programming or data base entries</li> <li>Problems caused by updating/upgrading or change of applied software</li> </ul>	<ul style="list-style-type: none"> <li>Check of application of Management system procedures</li> </ul>	
<b>Other calculation parameters</b>				
<ul style="list-style-type: none"> <li>Emission factors, oxidation factors, coefficients</li> </ul>	<ul style="list-style-type: none"> <li>The values and data sources applied are defined in the PDD and monitoring plan</li> </ul>	<ul style="list-style-type: none"> <li>Unintended or intended Modification of calculation parameters</li> <li>Wrong application of values</li> <li>Misinterpretations of the applied methodology and/ or the PDD</li> <li>Missing update of applicable regulatory framework (e.g. IPCC values)</li> </ul>	<ul style="list-style-type: none"> <li>Update-check of regulatory framework</li> <li>Countercheck of the applied MP in the MR against the methodology and the PDD</li> </ul>	<ul style="list-style-type: none"> <li><b>See Table A-2</b></li> </ul>
<b>Calculation Methods</b>				



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"> <li>• Applied formulae</li> <li>• Miscalculation</li> <li>• Mistakes in spreadsheet calculation</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced calculation and reporting tools</li> <li>• A CDM coordinator is in charge of the CDM related calculations</li> <li>• Usage of tested / counterchecked Excel spreadsheets</li> <li>• Involvement of external consultants</li> </ul>	<ul style="list-style-type: none"> <li>• The danger of miscalculation can only be minimized.</li> </ul>	<ul style="list-style-type: none"> <li>• Countercheck on the basis of own calculation.</li> <li>• Spread sheet walk-through.</li> <li>• Plausibility checks</li> <li>• Check of plots</li> </ul>	<ul style="list-style-type: none"> <li>• <b>See Table A-2</b></li> </ul>
<b>Monitoring reporting</b>				
<ul style="list-style-type: none"> <li>• Data transfer to the author of the monitoring report</li> <li>• Data transfer to the monitoring report</li> <li>• Unintended use of outdated versions</li> </ul>	<ul style="list-style-type: none"> <li>• An experienced CDM consultant is responsible for monitoring reporting.</li> <li>• CDM QMS procedures are defined</li> </ul>	<ul style="list-style-type: none"> <li>• The danger of data transfer mistakes can only be minimized</li> <li>• Inappropriate application of QMS procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Counter check with evidences provided.</li> <li>• Audit of procedure application</li> </ul>	<ul style="list-style-type: none"> <li>• <b>See Table A-2</b></li> </ul>



**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.
<b>A. Description of the project activity</b>				
<p><b>A.1. Purpose and general description of the project activity</b> <i>(EB 75, Annex 7, A.1)</i></p> <p><i>Check if section A.1 of the MR includes the following:</i></p> <ul style="list-style-type: none"> <li>- <i>Purpose of the PA and the measures taken to reduce GHG emissions</i></li> <li>- <i>Brief description of the installed technology and equipment</i></li> <li>- <i>Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.)</i></li> <li>- <i>Total emission reductions achieved in this monitoring period</i></li> </ul>	/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"> <li><input checked="" type="checkbox"/> Purpose of the PA and the measures taken to reduce GHG emissions</li> <li><input checked="" type="checkbox"/> Brief description of the installed technology and equipment</li> <li><input checked="" type="checkbox"/> Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods etc.)</li> <li><input checked="" type="checkbox"/> Total emission reductions achieved in this monitoring period</li> </ul> <p>In this context the following findings have been identified: N/A</p>	OK	OK
<p><b>A.2. Location of project activity</b> <i>(EB 75, Annex 7, A.2)</i></p> <p><i>Check if section A.2 of the MR reflects correctly the following:</i></p> <ul style="list-style-type: none"> <li>- <i>Host Party(ies)</i></li> <li>- <i>Region / State / Province etc.</i></li> <li>- <i>City / Town / Community etc.</i></li> </ul>	/MR/ /PDD/ /IM01/	<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"> <li><input checked="" type="checkbox"/> Host Party(ies)</li> <li><input checked="" type="checkbox"/> Region / State / Province</li> <li><input checked="" type="checkbox"/> City / Town / Community</li> </ul>	OK	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<ul style="list-style-type: none"> <li>- <i>Physical / geographical location (e.g. Latitude and Longitude)</i></li> </ul>		<input checked="" type="checkbox"/> Physical / Geographical location In this context the following findings have been identified: N/A		
<p><b>A.3. Parties and Project Participants</b>                      (EB 75, Annex 7, A.3)</p> <p><i>Check if section A.3 of the MR includes the following:</i></p> <ul style="list-style-type: none"> <li>- <i>All PPs as displayed on the UNFCCC website</i></li> <li>- <i>A correctly filled table as per the MR template</i></li> </ul>	/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
<p><b>A.4. Reference of applied methodology</b>                      (EB 75, Annex 7, A.4)</p> <p><i>Check if section A.4 of the MR correctly describes / includes the following:</i></p> <ul style="list-style-type: none"> <li>- <i>Reference to the applicable version of the methodology</i></li> <li>- <i>Reference to the applicable version(s) of relevant methodological tools</i></li> <li>- <i>Relevant EB decisions, if applicable</i></li> </ul>	/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 checked="" 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: N/A	OK	OK





<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><b>A.5. Crediting period of project activity</b>                      (EB 75, Annex 7, A.5)</p> <p><i>Check if section A.5 of the MR correctly includes the following:</i></p> <ul style="list-style-type: none"> <li>- <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></li> <li>- <i>Length and type of the crediting period</i></li> </ul>	/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"> <li><input checked="" type="checkbox"/> Start date of the crediting period.</li> <li><input checked="" type="checkbox"/> Type and length of the crediting period</li> </ul> <p>In this context the following findings have been identified:                      N/A</p>	OK	OK
<p><b>A.6. Publication of the Monitoring Report</b>                      (VVS, § 207)</p> <p><i>Check if the monitoring report has been made publicly available on the UNFCCC website before the verification commenced.</i></p> <p><i>Check if comments have been received and if yes, how they have been addressed.</i></p>	/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"> <li><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.</li> <li><input checked="" type="checkbox"/> No comments have been received.</li> </ul> <p>In this context the following findings have been identified:                      N/A</p>	OK	OK
<p><b>A.7. Compliance with standardized format of the Monitoring Report</b>                      (VVS, § 212 e)</p>	/MRT/	<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"> <li><input type="checkbox"/> the standardized MR template has been used</li> </ul>	<del>CAR</del> A1	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<i>Check (only) if the latest applicable MR template has 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: <b>(CAR A1)</b> The last version of the MR template available at UNFCCC website has not been used.		
<b>B. Implementation of project activity</b>				
<b>B.1. Description of implemented registered project activity</b> <b>(EB 75, Annex 7, B.1)</b>  <i>Check if section B.1 of the MR correctly describes / includes the following:</i> <ul style="list-style-type: none"> <li>- <i>Implementation status of the PA</i></li> <li>- <i>Detailed description of installed technology(ies) / technical processes and equipment applied</i></li> <li>- <i>Diagrams (where appropriate)</i></li> </ul>	/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"> <li><input checked="" type="checkbox"/> the description of the implementation status of the PA is in line with the applicable provisions of the project standard</li> <li><input checked="" type="checkbox"/> an appropriate description of the installed technology(ies), technical process and equipment incl. diagrams, where applicable, has been included</li> </ul> In this context the following findings have been identified: N/A	OK	OK
<b>B.1.1. Initial project implementation</b> <b>(VVS; § 225 a, 226)</b>  <i>Assess whether the project has been implemented and operated as per the registered PDD and are all physical features of the project in place?</i>  <i>Further focus on the potential phase wise implementation and check the reporting on the corresponding status and starting dates accordingly.</i>  <i>Check if the project is still in compliance with the</i>	/IM01/ /IM02/ /PDD/	<i>Description:</i> It was observed by the verification team on site visit that the project has been implemented and operated as per the registered PDD and all physical features of the project are in place. The installed power capacity is 110.8 MW and it is in accordance with the actual situation and registered PDD.  <i>Verifier's action:</i> Performed interviews, the PDD, the plates of the equipment and a demonstration of the calculation of the installed power capacity were used to assess this issue.	OK	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>applicability conditions of the methodology.</i></p> <p><i>Also, discuss – if applicable – the necessity of PRC notifications / approvals.</i></p>		<p><i>Conclusion:</i> The project has been implemented and operated as per registered PDD.</p>		
<p><b>B.1.2. Technical equipment changes (VVS; § 225 a, 226)</b></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 chapter B.2.</i></p>	<p>/MR/ /PDD/ /IM01/ /IM02/ /CAL/</p>	<p><i>Description:</i> It was verified that no equipment of the project activity has been exchanged or modified during the monitoring period. This is consistent with information provided in the MR. Furthermore, the MR, PDD and calculation spread sheet provide consistent notation of key equipment.</p> <p><i>Verifier's action:</i> The MR, calibration certificates and interviews were used to assess this issue.</p> <p><i>Conclusion:</i> No equipment of the project activity has been exchanged or modified.</p>	<p>OK</p>	<p>OK</p>
<p><b>B.1.3. Operation of the project activity (VVS; § 225 a, 226)</b></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,</i></p>	<p>/IM01/ /IM02/ /MAN/</p>	<p><i>Description:</i> The mode of operation for the project activity have not been changed or modified during this 1<sup>st</sup> 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 to confirm that there are no changes or modification undertaken during this monitoring</p>	<p>OK</p>	<p>OK</p>



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>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>period.</p> <p><i>Conclusion:</i> There are no changes for the mode of operation of the project activity during this monitoring period.</p>		
<p><b>B.1.4. Incidents</b> <b>(VVS; § 225 a, 226)</b></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>/MR/ /IM01/ /MAN/</p>	<p><i>Description:</i> No incidents and downtimes of equipment have been reported in MR as no major abnormalities have happened during the period.</p> <p><i>Verifier's action:</i> During the site visit, interviews were performed and the company system was cross-checked with information provided. In addition, the Preliminary inform of failures (incident operational reports) and Electronic request of disconnection /intervention to CDEC-SIC have been presented.</p> <p><i>Conclusion:</i> No major incidents and downtimes of equipment have happened during the period.</p>	<p>OK</p>	<p>OK</p>
<p><b>B.1.5. Legislation</b></p> <p>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.</p> <p>Assess, in case of changes, whether consequences</p>	<p>/IM01/ /IM02/ /LIC/</p>	<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>OK</p>	<p>OK</p>



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
for the PA with regard to relevant CDM requirements have been accounted for.  In case of changes data sources shall be referenced.		<i>Conclusion:</i> No changes have occurred.		
<b>B.1.6. Open issues from validation</b> <i>(VVS; § 213)</i>  <i>Check (esp. in case of 1<sup>st</sup> periodic verification) whether there are any open issues indicated in the validation report (e.g. FAR)?</i>	/VAL/	<input checked="" type="checkbox"/> There were no open issues addressed in the validation report  <input type="checkbox"/> All open issues from the validation have been appropriately addressed.  <input type="checkbox"/> The following issues related to the validation have not yet been appropriately addressed:	OK	OK
<b>B.1.7. Open issues from previous verification</b> <i>(VVS; §§ 213; 284 h)</i>  <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 checked="" 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:	OK	OK
<b>B.2. Post registration changes</b>				
<b>B.2.1. Are post registration changes applicable to the proposed project activity?</b>	/MR/ /IM01/ /IM02/	<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	OK	OK



Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.																																
		proceed with B.2.2.)																																		
<p><b>B.2.2. Temporary deviations from the registered monitoring plan or applied methodology (TDfrMP; TDfMM)</b> <i>(EB 75, Annex 7, B.2.1; VVS §§ 251 - 256)</i></p> <p><i>Indicate whether any temporary deviations have been applied during this monitoring period. In cases where approval has been sought from the EB please provide reference. If applied, provide a description of the deviation(s). 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. For deviation(s) that require prior approval by the Board, include the date of approval and reference number.</i></p>	<p>/PS/ /unfccc/ /MR/ /IM01/ /IM02/</p>	<table border="1"> <tr> <td data-bbox="1034 539 1111 619"><input checked="" type="checkbox"/></td> <td data-bbox="1111 539 1800 619">No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period</td> </tr> <tr> <td data-bbox="1034 619 1111 699"><input type="checkbox"/></td> <td data-bbox="1111 619 1800 699">The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC</td> </tr> <tr> <td data-bbox="1034 699 1111 882">1</td> <td data-bbox="1111 699 1800 882"> <table border="1"> <tr> <td data-bbox="1111 699 1317 738">Title</td> <td data-bbox="1317 699 1800 738"></td> </tr> <tr> <td data-bbox="1111 738 1317 786">Status</td> <td data-bbox="1317 738 1800 786"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> <tr> <td data-bbox="1111 786 1317 834">Appr.date</td> <td data-bbox="1317 786 1800 834"></td> </tr> <tr> <td data-bbox="1111 834 1317 882">Ref. No.</td> <td data-bbox="1317 834 1800 882"></td> </tr> </table> </td> </tr> <tr> <td data-bbox="1034 882 1111 1074">2</td> <td data-bbox="1111 882 1800 1074"> <table border="1"> <tr> <td data-bbox="1111 882 1317 930">Title</td> <td data-bbox="1317 882 1800 930"></td> </tr> <tr> <td data-bbox="1111 930 1317 978">Status</td> <td data-bbox="1317 930 1800 978"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> <tr> <td data-bbox="1111 978 1317 1026">Appr.date</td> <td data-bbox="1317 978 1800 1026"></td> </tr> <tr> <td data-bbox="1111 1026 1317 1074">Ref.No.</td> <td data-bbox="1317 1026 1800 1074"></td> </tr> </table> </td> </tr> <tr> <td data-bbox="1034 1074 1111 1209"><input checked="" type="checkbox"/></td> <td data-bbox="1111 1074 1800 1209">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 data-bbox="1034 1209 1111 1313"><input type="checkbox"/></td> <td data-bbox="1111 1209 1800 1313">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> <tr> <td data-bbox="1034 1313 1111 1367">1</td> <td data-bbox="1111 1313 1800 1367"> <table border="1"> <tr> <td data-bbox="1111 1313 1317 1367">Issue:</td> <td data-bbox="1317 1313 1800 1367"></td> </tr> </table> </td> </tr> </table>	<input checked="" type="checkbox"/>	No TDfrMP or TDfMM have been submitted to the UNFCCC prior to the current monitoring period	<input type="checkbox"/>	The following TDfrMP or TDfMM have been approved or are under approval by the UNFCCC	1	<table border="1"> <tr> <td data-bbox="1111 699 1317 738">Title</td> <td data-bbox="1317 699 1800 738"></td> </tr> <tr> <td data-bbox="1111 738 1317 786">Status</td> <td data-bbox="1317 738 1800 786"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> <tr> <td data-bbox="1111 786 1317 834">Appr.date</td> <td data-bbox="1317 786 1800 834"></td> </tr> <tr> <td data-bbox="1111 834 1317 882">Ref. 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<p><b>B.2.3. Corrections</b>                      (EB 75, Annex 7, B.2.2; VVS; §§ 257 - 259)</p> <p><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></p> <p><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,</i></p>	/PS/ /unfccc/ /MR/ /IM01/ /IM02/	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30px; text-align: center;"><input checked="" type="checkbox"/></td> <td colspan="2">During the verification of the current MP no need for corrections has been identified.</td> </tr> <tr> <td colspan="3"> <input type="checkbox"/> The following corrections have been applied:                             </td> </tr> <tr> <td style="text-align: center;">1</td> <td>Issue:</td> <td>Operational and management structure</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Issue:</td> <td>Data collection method</td> </tr> </table>	<input checked="" type="checkbox"/>	During the verification of the current MP no need for corrections has been identified.		<input type="checkbox"/> The following corrections have been applied:			1	Issue:	Operational and management structure	2	Issue:	Data collection method	CLB2	OK
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<p><i>provide the version number and the completion date of the revised PDD.</i></p> <p><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></p>		<p><i>Detailed description and justification for each correction:</i></p> <p>In this context the following findings have been identified:</p> <p>A CL has been raised for further clarifications as no need for Corrections has been identified.</p> <p><b>(CL B2)</b> The Corrections to the project activity referred at Section B.2.2 of the MR have to be better explained.</p> <p>As revealed during the site visit, no metering points are being changed; no change in a method of data collection has happened; neither a change at the management structure.</p>																										
<p><b>B.2.4. Permanent changes from the registered monitoring plan or applied methodology (PCfrMP; PCfMM)</b></p> <p><b>(EB 75, Annex 7, B.2.3; VVS; §§ 262 - 268)</b></p> <p><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></p> <p><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</i></p>	<p>/PS/ /unfccc/ /MR/ /IM01/ /IM02/</p>	<table border="1"> <tr> <td data-bbox="1034 948 1111 1027" style="text-align: center;"><input checked="" type="checkbox"/></td> <td colspan="2" data-bbox="1111 948 1800 1027">No PCfrMP or PCfMM have been submitted to the UNFCCC prior to the current monitoring period</td> </tr> <tr> <td data-bbox="1034 1027 1111 1107" style="text-align: center;"><input type="checkbox"/></td> <td colspan="2" data-bbox="1111 1027 1800 1107">The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC</td> </tr> <tr> <td data-bbox="1034 1107 1111 1294" style="text-align: center;">1</td> <td data-bbox="1111 1107 1317 1150">Title</td> <td data-bbox="1317 1107 1800 1150"></td> </tr> <tr> <td data-bbox="1034 1150 1111 1193"></td> <td data-bbox="1111 1150 1317 1193">Status</td> <td data-bbox="1317 1150 1800 1193" style="text-align: center;"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> <tr> <td data-bbox="1034 1193 1111 1236"></td> <td data-bbox="1111 1193 1317 1236">Appr.date</td> <td data-bbox="1317 1193 1800 1236"></td> </tr> <tr> <td data-bbox="1034 1236 1111 1294"></td> <td data-bbox="1111 1236 1317 1294">Ref. No.</td> <td data-bbox="1317 1236 1800 1294"></td> </tr> <tr> <td data-bbox="1034 1294 1111 1337" style="text-align: center;">2</td> <td data-bbox="1111 1294 1317 1337">Title</td> <td data-bbox="1317 1294 1800 1337"></td> </tr> <tr> <td data-bbox="1034 1337 1111 1383"></td> <td data-bbox="1111 1337 1317 1383">Status</td> <td data-bbox="1317 1337 1800 1383" style="text-align: center;"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> </table>	<input checked="" type="checkbox"/>	No PCfrMP or PCfMM have been submitted to the UNFCCC prior to the current monitoring period		<input type="checkbox"/>	The following PCfrMP or PCfMM have been approved or are under approval by the UNFCCC		1	Title			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved		Appr.date			Ref. No.		2	Title			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved	OK	OK
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<p><b>B.2.5. Changes to the project design of the registered project activity (CoPD)</b>  <b>(EB 75, Annex 7, B.2.4; VVS; §§ 269 - 282)</b></p> <p><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></p> <p><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></p>	<p>/PS/ /unfccc/ /MR/ /IM01/ /IM02/</p>	<table border="1"> <tr> <td data-bbox="1039 539 1111 590"><input checked="" type="checkbox"/></td> <td colspan="2" data-bbox="1111 539 1803 590">No CoPD has been submitted to the UNFCCC prior to the current monitoring period</td> </tr> <tr> <td data-bbox="1039 619 1111 670"><input type="checkbox"/></td> <td colspan="2" data-bbox="1111 619 1803 670">The following CoPD has been approved or are under approval by the UNFCCC</td> </tr> <tr> <td data-bbox="1039 699 1111 718">1</td> <td data-bbox="1111 699 1317 718">Title</td> <td data-bbox="1317 699 1803 718"></td> </tr> <tr> <td data-bbox="1039 746 1111 766"></td> <td data-bbox="1111 746 1317 766">Status</td> <td data-bbox="1317 746 1803 766"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> <tr> <td data-bbox="1039 794 1111 813"></td> <td data-bbox="1111 794 1317 813">Appr.date</td> <td data-bbox="1317 794 1803 813"></td> </tr> <tr> <td data-bbox="1039 842 1111 861"></td> <td data-bbox="1111 842 1317 861">Ref. No.</td> <td data-bbox="1317 842 1803 861"></td> </tr> <tr> <td data-bbox="1039 890 1111 909">2</td> <td data-bbox="1111 890 1317 909">Title</td> <td data-bbox="1317 890 1803 909"></td> </tr> <tr> <td data-bbox="1039 938 1111 957"></td> <td data-bbox="1111 938 1317 957">Status</td> <td data-bbox="1317 938 1803 957"><input type="checkbox"/> under approval; <input type="checkbox"/> approved</td> </tr> <tr> <td data-bbox="1039 986 1111 1005"></td> <td data-bbox="1111 986 1317 1005">Appr.date</td> <td data-bbox="1317 986 1803 1005"></td> </tr> <tr> <td data-bbox="1039 1034 1111 1053"></td> <td data-bbox="1111 1034 1317 1053">Ref.No.</td> <td data-bbox="1317 1034 1803 1053"></td> </tr> <tr> <td data-bbox="1039 1082 1111 1133"><input checked="" type="checkbox"/></td> <td colspan="2" data-bbox="1111 1082 1803 1133">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 data-bbox="1039 1161 1111 1212"><input type="checkbox"/></td> <td colspan="2" data-bbox="1111 1161 1803 1212">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 data-bbox="1039 1241 1111 1260">1</td> <td data-bbox="1111 1241 1317 1260">Issue:</td> <td data-bbox="1317 1241 1803 1260"></td> </tr> </table>	<input checked="" type="checkbox"/>	No CoPD has been submitted to the UNFCCC prior to the current monitoring period		<input type="checkbox"/>	The following CoPD has been approved or are under approval by the UNFCCC		1	Title			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved		Appr.date			Ref. No.		2	Title			Status	<input type="checkbox"/> under approval; <input type="checkbox"/> approved		Appr.date			Ref.No.		<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.		1	Issue:		OK	OK
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<b>C. Description of monitoring system</b>																
<p><b>C.1. Monitoring Plan – PDD Compliance (VVS, §§ 233-236)</b></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>	/MR/ /PDD/	<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" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30px; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 100px;">The MP is completely in accordance with the last registered/approved version of the PDD / MP.</td> </tr> </table>	<input checked="" type="checkbox"/>	The MP is completely in accordance with the last registered/approved version of the PDD / MP.	OK	OK										
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<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>												
<ul style="list-style-type: none"> <li>- <i>all parameters stated in the MP of the registered PDD have been monitored and updated as applicable</i></li> <li>- <i>the monitoring equipment has been controlled and calibrated as per the MP</i></li> <li>- <i>the monitoring results are consistently recorded as per the approved frequency</i></li> <li>- <i>QA/QC procedures have been applied in accordance with the MP</i></li> </ul>		As revealed during the site visit, no changes to the monitoring plan have been performed during the monitoring period.														
<p><b>C.2. Monitoring Plan – Meth Compliance (VVS, §§ 229-232)</b></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 but may enhance the level of accuracy and completeness of the monitoring plan – this esp. applies for SSC PAs.</i></p>	/MR/ /PDD/ /ACM02/ /MT/	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: <table border="1" data-bbox="1039 951 1803 1287" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30px; text-align: center;"><input checked="" type="checkbox"/></td> <td colspan="2">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 style="text-align: center;"><input checked="" type="checkbox"/></td> <td colspan="2">The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Title (of the tool)</td> <td>Tool to calculate the emission factor for an electricity system</td> </tr> <tr> <td></td> <td>Version</td> <td>2</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 checked="" type="checkbox"/>	The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:		1	Title (of the tool)	Tool to calculate the emission factor for an electricity system		Version	2	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 checked="" type="checkbox"/>	The MP is completely in accordance with the applied tools which the methodology references. A breakdown of the referenced tools is as follows:															
1	Title (of the tool)	Tool to calculate the emission factor for an electricity system														
	Version	2														



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 40%;">MP compliance</td> <td style="width: 40%;"> <input checked="" type="checkbox"/> full compliance  <input type="checkbox"/> findings have been raised  <input type="checkbox"/> N/A (for MP)                             </td> </tr> </table> <p>In this context the following findings have been identified:</p> <p>Regarding aspects that are not specified in the methodology the following issues have been identified which may enhance the level of accuracy and completeness of the MP:</p> <p>N/A</p>			MP compliance	<input checked="" type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A (for MP)		
		MP compliance	<input checked="" type="checkbox"/> full compliance <input type="checkbox"/> findings have been raised <input type="checkbox"/> N/A (for MP)					
<p><b>C.3. Management System</b>                      (VVS, § 217 (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>	/PDD/ /MR/ /IM01/ /IM02/ /MAN/	<p><i>Description:</i> It was observed in the site visit that a robust monitoring system was implemented by the company. All measurements comply with national regulations for the electric sector. The collection of electricity generation data is made based on best practice procedures and a specific CDM structure has been implemented at Pacific Hydro to allow a better follow up of CDM requirements.</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 data monitoring system is appropriate for the project activity and no changes to the management system have been performed during the monitoring period.</p>	OK	OK				
<p><b>C.4. Metering diagram</b></p>	/PS/	<p><i>Description:</i> The metering diagram of the plant is presented at</p>	OK	OK				



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><b>(EB 75, Annex 7, C; PS §196)</b></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>	/MR/ /PDD/	<p>Section C of the MR describing the monitoring points.</p> <p><i>Verifier's action:</i> The MR was reviewed against PDD and interviews were performed with company employees.</p> <p><i>Conclusion:</i> The MR includes the metering diagram of the plant demonstrating the monitoring points.</p>		
<p><b>C.5. Roles and Responsibilities</b> <b>(EB 75, Annex 7, C; PS §196)</b></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>	/PS/ /PDD/ /MR/ /IM01/ /IM02/ /MAN/ /TRAIN/	<p><i>Description:</i> The roles and responsibilities of operators and management staff of the plant could be observed during the site visit. It was observed as well that all required training have been carried out for these key roles. In addition, the roles and responsibilities and training are described at Section C of MR.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals and training certificates.</p> <p><i>Conclusion:</i> Roles, responsibilities and training are described at the MR in accordance with the verified during the site visit.</p>	OK	OK
<p><b>C.6. Emergency procedures for the monitoring system</b> <b>(EB 70 Annex 11, C; PS §196)</b></p> <p><i>Check, as appropriate, whether relevant emergency</i></p>	/PS/ /PDD/ /MR/ /IM01/	<p><i>Description:</i> There is an emergency manual and emergency procedures put in place by the company.</p> <p><i>Justification of evidences:</i> The MR was reviewed against the</p>	OK	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<i>procedures for the monitoring system have been included in the MR and assess whether these procedures have been implemented, when required</i>	/MAN/	interviews and the operation and management manuals.  <i>Conclusion:</i> No issues have been found in this topic as the manual and procedures could be verified during the site visit.		
<p><b>C.7. Data archive and data protection (PS §56 b)</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>	/PDD/ /MR/ /IM01/ /IM02/ /MAN/	<p><i>Description:</i> Procedures for data archive and data protection are established and put in place according to the MP. It is informed that the electricity generation data is collected automatically. The data is monthly consolidated and sent to the commercial area and to CDEC-SIC.</p> <p><i>Verifier's action:</i> The MR was reviewed against the interviews and the operation and management manuals and procedures.</p> <p><i>Conclusion:</i> No issues have been found in this topic as all records of monitoring parameters are archived according to the monitoring plan.</p>	OK	OK
<p><b>D. Data and parameters</b></p>				
<p><b>D.1. Data and Parameters fixed ex ante</b></p>				



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><b>a) Compliance with registered PDD</b>  <b>(EB 70 Annex 11; D1)</b>                      Check whether the value applied is in compliance with the registered PDD.</p>	<p>/PDD/                      /MR/                      /ACM02/</p>	<p><i>Description:</i> The fixed parameters at the registered PDD are:</p> <ul style="list-style-type: none"> <li>- <math>EF_{grid,OM-adj,y}</math>;</li> <li>- <math>EF_{grid,BM,y}</math>;</li> <li>- <math>EF_{grid,CM,y}</math>;</li> <li>- <math>CAP_{BL}</math>;</li> <li>- <math>A_{BL}</math>.</li> </ul> <p>Nevertheless, parameters <math>CAP_{BL}</math> and <math>A_{BL}</math> are missing at the MR. Thus, CAR D4 was raised.</p> <p><i>Verifier's action:</i> MR was cross-checked against the PDD.</p> <p><i>Conclusion:</i>  <b>(CL D3)</b> Parameters <math>Cap_{BL}</math> and <math>A_{BL}</math> are missing at Section D.2 of the MR.</p>	<p><del>CL-D3</del></p>	<p>OK</p>





Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<p><b>b) Compliance with the applied methodology (EB 70 Annex 11; D1)</b></p> <p><i>Check whether the value applied is in compliance with the applied methodology or any other tool.</i></p>	<p>/PDD/ /MR/ /ACM02/</p>	<p><i>Description:</i> The fixed parameters are <math>EF_{grid,OM-adj,y}</math>; <math>EF_{grid,BM,y}</math>; <math>EF_{grid,CM,y}</math>; <math>CAP_{BL}</math>; and <math>A_{BL}</math> and they are in accordance with applied methodology.</p> <p>Nevertheless, as parameters <math>CAP_{BL}</math> and <math>A_{BL}</math> are missing, CL D3 was raised.</p> <p><i>Verifier's action:</i> The MR was reviewed and cross-checked against the PDD and the applied methodology.</p> <p><i>Conclusion:</i> Refer to CL D3 above.</p>	<p>CL-D3</p>	<p>OK</p>
<b>D.2. Data and Parameters monitored</b>				
<b>D.2.1. <math>EG_{facility,y}</math></b>				
<p><b>a) Measurement / Determination method (VVS, §§ 233, 236)</b></p> <p><i>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)).</i></p> <p><i>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</i></p>	<p>/IM01/ /IM02/ /PDD/ /MR/ /ACM02/ /MT/</p>	<p><i>Description:</i> <b>Quantity of net electricity generation supplied by the project plant/unit to the grid in year y</b></p> <p><i>Description:</i> According to the MP, the parameter is the total amount of net electricity generated by the plant.</p> <p>The measurement is according with the registered MP and there was no exchange of relevant equipment, as verified during the site visit.</p> <p>Although meters M1 and M2 appear at the diagram of the registered PDD as they are located at the Chacayes plant, they measure the generated electricity of the plant, not the net delivered electricity, therefore not having a role at the CDM monitoring.</p> <p>By the other hand, the meters that measure Chacayes' net electricity delivered to the grid are meters M5 and M6, located at</p>	<p>OK</p>	<p>OK</p>



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>		<p>Sauzal Substation. At this Sauzal substation, also the electricity from Sauzal plant is delivered. Nevertheless, meters M5 and M6 are exclusive from Chacayes and only measure its electricity, as could be verified during the site visit.</p> <p>The measurement / determination method is in accordance with the registered MP and no changes have occurred during the monitoring period.</p> <p><i>Verifier's action:</i> Interviews, equipment manuals and the company system have been checked to evaluate this issue.</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>		
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 237-243)</b></p> <p><i>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 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>/CAL/ /MAN/ /MR/ /GEN/</p>	<p><i>Description:</i> The calibrations of the meters are up to date and the values are double checked.</p> <p><i>Verifier's action:</i> Calibration certificates, Pacific Hydro and CDEC-SIC reports, monitoring plan and the MR were checked by the verification team</p> <p><i>Conclusion:</i> QA/QC procedures are met. By means of document review an accuracy of 0.2% for the meters can be confirmed.</p>	<p>OK</p>	<p>OK</p>



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<p><b>c) Correctness</b>  <b>(VVS, §§ 233, 236)</b></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>	/CAL/ /MR/ /VER/ /GEN/ /XLS/	<p><input type="checkbox"/> Correct      <input checked="" type="checkbox"/> Not correct</p> <p><i>Description:</i> The given value in the monitoring report is not the most conservative one.</p> <p><i>Verifier's action:</i> The MR, Excel spread sheet and Pacific Hydro and CDEC-SIC reports were checked.</p> <p><i>Conclusion:</i> The value given in the monitoring report has to be revised.</p> <p><b>(CAR D4)</b> The value of the monitored parameter <math>EG_{\text{facility},y}</math> presented at Section D.2 is not the most conservative one and therefore is not consistent with the one used for the ER calculations presented at Section E.1.</p>	CAR D4	OK
<b>D.2.2. Cap<sub>PJ</sub></b>		<p><i>Description:</i>      <b>Installed capacity of the project activity after the implementation of the project activity</b></p>		
<p><b>a) Measurement / Determination method</b>  <b>(VVS, §§ 233, 236)</b></p> <p><i>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)).</i></p> <p><i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination</i></p>	/MR/ /ACM02/ /IM01/	<p><i>Description:</i> The monitoring parameter is determined by the plates of equipment and necessary calculations.</p> <p><i>Verifier's action:</i> Interviews, equipment manual and equipment plates were cross-checked.</p> <p><i>Conclusion:</i> The monitoring of this parameter is in line with the registered MP of the PDD.</p>	OK	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>				
<p><b>b) Accuracy and QA/QC Procedure (VVS, §§ 237-243)</b></p> <p><i>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 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>	/MR/ /IM01/	Not applied.	N/A	N/A
<p><b>c) Correctness (VVS, §§ 233, 236)</b></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</i></p>	/MR/ /IM01/	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct</p> <p><i>Description:</i> The given value in the monitoring report is consistent with the data found in the visit performed by verification team.</p> <p><i>Verifier's action:</i> The equipment plates were cross-checked with equipment manual and interview of company employees.</p>	OK	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>be given.</i></p> <p><i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i></p>		<p><i>Conclusion:</i> The given value in MR is correct.</p>		
<p><b>D.2.3. A<sub>PJ</sub></b></p>		<p><i>Description:</i> <b>Area of the single reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full</b></p>		
<p><b>a) Measurement / Determination method (VVS, §§ 233, 236)</b></p> <p><i>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)).</i></p> <p><i>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.</i></p> <p><i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the PDD and the applied methodology.</i></p>	<p>/PDD/ /MR/ /ACM02/ /RES/</p>	<p><i>Description:</i> The monitoring parameter should be measured by an annual topographic survey, as per the registered PDD. As the project activity has started commercial operations on 2011-12-31 and only one topographic survey has been presented to the verification team, CL D5 was raised.</p> <p><i>Verifier's action:</i> Interviews were performed and the survey has been presented.</p> <p><i>Conclusion:</i> <b>(CL D5)</b> The monitoring parameter A<sub>PJ</sub> (Area of the single reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full) should be measured by an annual topographic survey, as per the registered PDD.</p> <p>Nevertheless, the project activity has started commercial operations on 2011-12-31 and only one topographic survey has been presented to the verification team.</p>	<p><del>CL D5</del></p>	<p>OK</p>
<p><b>b) Accuracy and QA/QC Procedure</b></p>	<p>/PDD/ /MR/</p>	<p><i>Description:</i> The monitoring has been done by a topographic survey. Nevertheless, as per the registered PDD, the monitoring</p>	<p><del>CL D5</del></p>	<p>OK</p>



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><b>(VVS, §§ 237-243)</b></p> <p><i>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 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>	/ACM02/	<p>parameter should be measured by an annual topographic survey.</p> <p>Thus, CL D5 was raised to clarify the situation.</p> <p><i>Verifier's action:</i> Interviews were performed and the survey has been presented.</p> <p><i>Conclusion:</i> Refer to CL D5 above.</p>		
<p><b>c) Correctness</b> <b>(VVS, §§ 233, 236)</b></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>	/PDD/ /MR/ /ACM02/ /RES/	<p><input checked="" type="checkbox"/> Correct      <input type="checkbox"/> Not correct</p> <p><i>Description:</i> The given value in the monitoring report is consistent with the topographic survey presented to the verification team.</p> <p><i>Verifier's action:</i> The survey has been presented.</p> <p><i>Conclusion:</i> The given value in MR is correct.</p>	OK	OK
<p><b>D.3. Sampling</b></p>				



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><b>a) Implementation of sampling plan</b>  <b>(EB70 Annex 11; D3)</b></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> <ul style="list-style-type: none"> <li><i>a) Description of the implemented sampling design</i></li> <li><i>b) Collected data</i></li> <li><i>c) Analysis of collected data</i></li> <li><i>d) Demonstration on whether the required confidence/precision has been met.</i></li> </ul>		<p><input checked="" type="checkbox"/> No sampling approach has been used by the PP to determine the monitored parameters</p>	N/A	N/A
<p><b>b) Sampling during verification</b></p> <p><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></p>		<p><input checked="" type="checkbox"/> No sampling approach has been used by the VT to verify the monitored parameters</p>	N/A	N/A
<b>E. Calculation of Emission reductions</b>				
<p><b>E.1. Traceability</b>  <b>(VVS, §§ 212, 214)</b></p> <p><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</i></p>	/XLS/	<p><i>Description:</i> The Excel calculation spread sheet was used and the calculations are completely traceable to the raw data and formulae applied are in line with MP and are visible.</p> <p><i>Verifier's action:</i> An unprotected Excel calculation spreadsheet has been provided and is completely visible.</p>	OK	OK





<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<i>visible.</i>		The formulas in the excel sheet were reviewed in detail against the MP, applied meth and tools. MR was checked by verification team  <i>Conclusion:</i> All information in spreadsheet calculation could be assessed and is fully traceable.		
<b>E.2. Parameter consistency (VVS, § 214)</b>  <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 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>	/XLS/ /GEN/ /MR/	<i>Description:</i> The monitored parameters and data used for the calculations are applied consistently in the MR and ER calculation sheet.  <i>Verifier's action:</i> The verification team performed a complete review of MR, ER calculations sheet, methodology and relevant reference documents of Pacific Hydro and CDEC-SIC.  <i>Conclusion:</i> The parameters and data used are consistent.	OK	OK
<b>E.3. Correctness of calculation (VVS, §§ 244-245)</b>  <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</i>	/XLS/ /MR/ /PDD/ /CAL/ /GEN/	<i>Description:</i> The net energy generated by the PA was not calculated conservatively as the values of generation of electricity are not rounded down.  Thus, CAR E6 was raised.  <i>Verifier's action:</i> Certificates of calibration, Excel calculations, Pacific Hydro and CDEC-SIC reports and monitoring report were	<del>CAR E6</del>	OK





<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<p><i>monitoring plan.</i></p> <p><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></p>		<p>checked by the verification team</p> <p><i>Conclusion:</i></p> <p><b>(CAR E6)</b> The figures used for the generated energy are not the most conservative as they shall be rounded down.</p> <p>The respective ER calculations shall be revised at Section E.1.</p>		
<p><b>E.4. Emission reductions table</b>                      (EB 75, Annex 7, E.4)</p> <p><i>Check if the MR includes a summary table of the emission reductions calculation specifying separately</i></p> <ul style="list-style-type: none"> <li>- Total baseline emissions</li> <li>- Total project emissions:</li> <li>- Total leakage</li> <li>- Total emission reductions.</li> </ul> <p><i>Assess whether the values are correct or need to be revised as a consequence of issues identified above.</i></p>	/XLS/ /MR/	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> The MR includes in section E.4 a summary table of the emission reductions calculation.</li> <li><input checked="" type="checkbox"/> The summary table specified the total baseline, project and leakage emissions as well as the total emission reductions separately.</li> <li><input type="checkbox"/> The values as specified in the ER summary table are correct; no issues have been identified during the verification which requires changes in the ER calculation.</li> <li><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.</li> </ul> <p>In this context the following additional findings have been identified:</p> <p>CAR E6</p>	<del>CAR E6</del>	OK
<p><b>E.5. Comparison with ex-ante determined emission reductions</b>                      (EB 75, Annex 7, E.5; E.6)</p>	/XLS/ /MR/ /PDD/	<p><i>Description:</i> A comparison of actual values with estimates of registered PDD was presented in Section E.5 and a reduction of emission reductions was observed. However, CAR E6 needs to be closed in order to assess this issue.</p>	<del>CAR E6</del>	OK



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
<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><i>Verifier's action:</i> MR, PDD and calculations spread sheet were checked by verification team.</p> <p><i>Conclusion:</i> Refer to CAR E6 above.</p>		
<p><b>E.6. ER during the 1<sup>st</sup> commitment period and the period from 1 January 2013 onwards</b>  <b>(EB 75, Annex 7, E.7)</b></p> <p><i>Check if the MR includes in chapter E.7 a breakdown of the actual ER into</i></p> <p style="margin-left: 40px;"><i>a) ER up to 2012-12-31 and</i></p> <p style="margin-left: 40px;"><i>b) ER from 2013-01-01 onwards</i></p> <p><i>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.</i></p>	<p>/XLS/ /MR/</p>	<p><input checked="" type="checkbox"/> The MR in section E.7 includes a summary table of the ER breakdown</p> <p style="margin-left: 40px;"><i>a) ER up to 2012-12-31 and</i></p> <p style="margin-left: 40px;"><i>b) ER from 2013-01-01 onwards</i></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 style="margin-left: 40px;"><input type="checkbox"/> The ER have completely been generated during the first commitment period</p> <p style="margin-left: 40px;"><input type="checkbox"/> The ERs have completely been generated from 2013-01-01 onwards,</p> <p style="margin-left: 40px;"><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</p>	<p>OK</p>	<p>OK</p>



<b>Checklist Item</b> (incl. guidance for the verification team)	<b>Reference</b>	<b>Verification Team Comments</b> (Means and results of assessment)	<b>Draft Concl.</b>	<b>Final Concl.</b>
		applicable guidance. In this context the following additional findings have been identified: N/A		



**ANNEX 2: 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. Marcelo Sebben**

SCHEME	STATUS	VALID UNTIL
CDM	Assessor (Validation, Verification)	2016-04-07
VCS / ISO 14064-2	Assessor	2016-04-07

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewable Energies

297 - Rev. 2, Date: 2013-04-08

297\_S01-VA060-F20\_2013-04-08\_rev2.doc S01-VA060-F20 rev3 / 2012-10-25

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

**Mr. Dr. Jochen Schubert**

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2014-05-11
VCS	Senior Assessor (Validation, Verification) Technical Reviewer	2014-05-11

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR INCLUDE SUB-AREAS
1.2	Renewable Energies	1.2.1 Hydro
		1.2.2 Wind
		1.2.3 Geothermal
		1.2.4 Solar
		1.2.5 Total
13.1	Waste handling and disposal	13.1.1 Waste management
		13.1.2 Waste water management

056 – Rev. 2, Date: 2011-07-29

056\_S01-F003\_2011-07-29\_rev2 S01-F003 rev0 / 2010-04-19