
VERIFICATION AND CERTIFICATION REPORT

Rio Taquesi Hydroelectric Power Project

UN PA 1031

Monitoring Period: 01/03/2011 – 30/06/2012

(Both days inclusive)

SGS Climate Change Programme

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Publication of Monitoring Report:			
Monitoring Period:		01/03/2011 - 30/06/2012	
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Summary:			
SGS United Kingdom Ltd has performed the second periodic verification of the second crediting period of the CDM project Rio Taquesi Hydroelectric Power Project, with UNFCCC reference number 1031, registration date of 16/06/2007. The second crediting period started from 01/07/2009. The verification includes confirming the implementation of the monitoring plan of the revised PDD version 5 dated 06/02/2013 and the application of the monitoring methodology as per ACM0002 version 8 dated 28/11/2008 and the "Tool to calculate the emission factor for an electricity system" version 1.1 dated 29/07/2008. A site visit was conducted to verify the data submitted in the monitoring report. SGS confirms the following has been reviewed: (a) The registered PDD, the revised PDD, including the revised monitoring plan and the corresponding validation reports; (b) The monitoring report and previous verification reports; (c) The applied monitoring methodology; (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board; (e) All information and references relevant to the project activity's resulting in emission reductions. The project includes the operation of two run-of-river hydroelectric power plants (Chojlla, 38.4 MW and Yanacachi, 51.1 MW) to provide energy to the national interconnected system of Bolivia, therefore displacing energy generated from fossil fuels (mostly by natural gas open cycle thermoelectric plants). The project plants are located in the Taquesi and Unduavi rivers at Sud Yungas area in the west of the country, 90 km by road (40 km in straight line) from La Paz, the capital city of Bolivia. SGS confirms that the project is implemented in accordance with the validated and registered Project Design Document and with the Revised Project Design document as well. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 286,328 tCO₂e emission reductions during the period 01/03/2011 up to 30/06/2012.			
Subject:			
CDM Verification			
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Abbreviations

AE	Social Control and Regulation Authority of the Electricity Sector
BM	Build Margin
BTU	British Thermal Unit
CNDC	National Load Dispatch Committee (Spanish Comité Nacional de Despacho de Carga) is the operative unit of the SIN or grid of Bolivia and the administrator of the electricity market. It was created by law: Ley N° 1604 (Ley de Electricidad) on December 21st 1994 and it began its activities on February 1996, it is under supervision of the former Superintendence of Electricity, today Supervision and Social Control Authority of Electricity. The CNDC is in charge of coordinating the electricity generation and transmission of the SIN and also to plan and apply an optimum dispatch of energy to satisfy the demand. The CNDC also calculates node prices and the balance of the electricity transfers in the integrated operation of the system.
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification Request
CP2	Second Crediting Period
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
COP/MOP	Conference of the Parties / Meeting of the Parties
DNA	Designated National Authority
DO	Diesel Oil
DOE	Designated Operational Entities
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
HB	Hidroeléctrica Boliviana S.A. project participant
HIDROBOL	Hidroeléctrica Boliviana S.A. project participant
HR	Heat rate
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MP2	Monitoring Period 2
MR	Monitoring Report
NCV	Net calorific value
NG	Natural Gas
OM	Operating Margin
PDD	Project Design Document
PP	Project Participant
PS	Clean Development Mechanism Project Standard, also referred to as Project Standard in short
SDDP	Stochastic Dual Dynamic Programming
SIN	National Interconnected Grid of Bolivia (Sistema Interconectado Nacional)
SMEC	Commercial Metering System (Spanish: Sistema de Medición Comercial) refers to the set of meters located at the nodes of the SIN that can be remotely accessed through the SCADA (Supervisory Control And Data Acquisition) system by the CNDC and agents like HB. transactions of the power companies for their energy injected to the grid.
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

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1. Introduction

1.1 Objective

SGS United Kingdom Ltd has been contracted by Hidroeléctrica Boliviana S.A. (one of the project participants of the project) to perform an independent verification of its CDM project Rio Taquesi Hydroelectric Power Project. CDM projects must undergo periodic audits and verification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The emissions report conforms with the requirements of the monitoring plan in the revised PDD and the approved methodology; and
- The data reported are complete and transparent.

1.2 Scope

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on the validated and registered project design document and the monitoring report. The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

SGS has, based on the recommendations in the Validation and Verification Standard, employed a risk-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

Due professional care has been exercised and ethical conduct has been followed by the assessment team during the verification process. The verification report is a fair presentation of the verification activity.

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

1.3 Project Activity and Period Covered

This engagement covers emissions and emission reductions from anthropogenic sources of greenhouse gases included within the project boundary of the following project and period.

Title of Project Activity: Rio Taquesi Hydroelectric Power Project

UNFCCC Registration Number: 1031

Monitoring Period Covered in this Report: 01/03/2011 – 30/06/2012

Project Participants:

Host Country:

- Hidroeléctrica Boliviana S.A. (Bolivia)
- Vice Ministry of Land Planning and Environment (Bolivia)
- C-Trade – Comercializadora de Carbono Ltda. (Bolivia)

Annex I Country:

- Corporación Andina de Fomento - CAF (acting as administrator of the CAF-Netherlands CDM Facility for the Government of the Netherlands), Netherlands
- Ministry of Infrastructure and Environment (IenM) (Netherlands)
- Tenaska International Energy LLC (Switzerland)

Location of the Project Activity:

The power plants are located in the Taquesi and Unduavi rivers at Sud Yungas area in the west of the country, 40 km in straight line and 90 km by road from La Paz capital city/La Paz Department; in the Sud Yungas Province/Third

Municipal Section (Yanacachi), Bolivia.

The purpose of the project is to reduce GHG emissions by generating electricity using two run-of-river hydroelectric power plants (Chojlla 38.4 MW and Yanacachi Norte 51.1 MW) and providing this energy to the National Interconnected Grid of Bolivia, therefore displacing energy generated from fossil fuels power plants (mostly by natural gas open cycle thermoelectric plants). Each plant is equipped with one Francis turbine-generator unit and ancillary systems. The project plants are located in the Taquesi and Unduavi rivers at Sud Yungas area, 40 km in straight line from La Paz capital city.

The Project Participant owns and operates another generating facility – named “Chojlla Antigua” – with a capacity of 0.85 [MW]. Chojlla Antigua units (two) are not part of the CDM project and the energy generated by these units, (which represents around 2% of the energy produced by the CDM project), is not included in the CDM generation and injections to the grid.

2. Methodology

2.1 General Approach

SGS performs the verification work using a Periodic Verification Checklist prepared following the VVS. The Periodic Verification Checklist describes the verification approach and the sampling plan.

The checklist gives the assessment team a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

Using the Periodic Verification Checklist, SGS verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit and a desk review of the monitoring report. This verification report describes the findings of this assessment.

Only verification activities undertaken after the publication of the monitoring report on the UNFCCC CDM website were used as a basis for SGS to conclude our verification and submit a request for issuance of CERs to the Board.

2.2 Verification Team for this Assessment

A team of competency has been selected to perform the verification of the project.

Name	Role
Alicia Fernández	Lead Assessor/Team Leader/Local Assessor
David Watts	Sectoral Scope Expert (TA 1.2)

2.3 Means of Verification

2.3.1 Review of Documentation

The validated PDD, the monitoring report submitted by the client and additional background documents related to the project performance were reviewed. A complete list of all documents reviewed is attached in section 8 of this report.

2.3.2 Site Visits

As part of the verification, the following on-site inspection have been performed by all members of the assessment team.

Location: Hidroeléctrica Boliviana SA power plants (Yanacachi Norte and Chojlla) and Pichu & Chuspipata sub-stations.	
Date: 28 & 29/11/2012	
Coverage:	Source of Information / Persons Interviewed
Visit of the installations to confirm the implementation and operation of the proposed CDM project activity as per the registered PDD. Visual checks and photos taken of the turbines and meters to confirm the serial numbers. Observations of established activities to confirm the monitoring practices and the QA/QC procedures established in the registered monitoring plan. Interviews with personnel in charge of the PA to confirm that the operational and data collection/reporting procedures are implemented in accordance with the methodology and PDD. Documentation review, data sources, records, calibration certificates and revision of the raw data (provided previously to the site visit directly by CNDC) against the information provided in the ERs calculation spreadsheet.	• Marco Antonio Mejillones (HB, Commercial Analyst) • Cleber Romao (HB, Chief of maintenance and operations) • Froilan Quiroz (HB, Operation's Chief) • Gaston Lemaitre (HB, Operations Manager)

2.4 Reporting of Findings

As an outcome of the verification process, the team can raise different types of findings.

In general, where insufficient or inaccurate information is available and clarification or new information is required the team shall raise a Clarification Request (CL) specifying what additional information is required.

Where a non-conformance arises the team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- I. Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- II. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- III. Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- IV. Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants

The verification process may be halted until this information has been made available to comply with the requirements of the CDM Executive Board. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR.

A clarification request (CL) will be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.

Corrective Action Requests and Clarification Requests are raised in the Periodic Verification Checklist. The Project Developer is given the opportunity to “close” outstanding CARs and respond to CLs.

Forward Action Requests (FARs) may be raised during verification for actions where the monitoring and reporting require attention and/or adjustment for the next verification period, which are for the benefit of future projects and future verification activities. These have no impact upon the completion of the verification activity.

All CARs, CLs and FARs for this verification period are included in this report.

2.5 Internal Quality Control

Following the completion of the assessment process and a recommendation by the Assessment Team, all documentation will be forwarded to a Technical Review Team. The task of the Technical Review Team is to check that all procedures have been followed and all conclusions are justified. The Technical Reviewer will either accept or reject the recommendation made by the assessment team.

Technical Review Team

Name	Role
Michael Wu	Technical Reviewer and Sectoral Scope Expert (TA 1.2)

3. Verification Findings

3.1 Project Implementation

The purpose of the project is to reduce GHG emissions by generating electricity using two run-of-river hydroelectric power plants (Chojlla 38.4 MW and Yanacachi Norte 51.1 MW) and providing this energy to the National Interconnected Grid of Bolivia. The project complies with the applicability conditions defined in ACM0002 version 8, it was verified as follow:

- *The project activity is the installation or modification/retrofit of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;*
The project consists in the implementation of two in-cascade hydro power plants. Applicability condition met.
- *In case of hydro power plants:*
 - o *The project activity is implemented in an existing reservoir, with no change in the volume of reservoir;*
Not applicable.
 - o *The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²;*
Not applicable.
 - o *The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².*
The power plants of the project corresponds to run-of-river plants that have a regulation reservoir, as per the registered PDD (ref 1a) and validation report the project power density is 3,774 W/m². Applicability condition met.
- *The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available;*
The geographical boundaries and the involved grid is defined in the PDD (ref 1), the information is consistent with the grid diagram available at CNDC web site (ref 8).
- *Applies to grid connected electricity generation from landfill gas to the extent that it is combined with the approved "Consolidated baseline methodology for landfill gas project activities" (ACM0001); and*
This condition not applicable to the Project, since it is a Hydropower plant.
- *5 years of historical data (or 3 years in the case of non hydro project activities) have to be available for those project activities where modification/retrofit measures are implemented in an existing power plant.*
The project corresponds to the implementation of a new power plant, this condition is not applicable. As per PDD (ref 1) the project obtained the generation licence in 2000. It was verified against the CNDC's historical records (ref 7) that in 2000 and 2001 the HB's injections recorded corresponds to Chojlla Antigua, it belongs to the PP as well but they are not part of the CDM project and were not retrofitted. It was verified against 2002 CNDC records, that the first injection of the project power plants to the grid was in June 2002 (ref 7).

The methodology is not applicable to the following:

- *Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;*
Not applicable.
- *Biomass fired power plants;*
Not applicable.
- *Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m².*
As verified and stated before, the project has a power density over 4 W/m².

The project was implemented and equipment installed as described in the registered and revised PDD (ref 1a & ref 1d); the monitoring plan is implemented as per the revised PDD (ref 1d).

- (a) The project is a run-of-river hydroelectric power plant with an effective capacity of 89.5 megawatts of renewable electricity in two in-cascade plants. The project was implemented as described in the registered PDD (ref. 1a) (<http://cdm.unfccc.int/Projects/DB/DNV-CUK1174992011.56/view>) and the previous verification reports and PDD of the first crediting period (<http://cdm.unfccc.int/Projects/DB/DNV-CUK1174992011.56/view?cp=1>). The project was registered on 16/06/2007 and the starting date was on 28/01/2000. The project renewed its crediting period on 02/11/2009 and currently is under verification for the second monitoring period from 01/03/2011 – 30/06/2012.
- (b) The implementation of the registered project activity has been done according to the registered PDD (ref. 1a), revised PDD (ref 1d) and also the previous PDD (ref. 91a – first crediting period). It was verified that the same units (turbines/generators) verified on site on previous verifications were still installed on site. During the site visit carried out on 28&29/11/2012, it was verified that the project is under normal operation. It was verified as well that the monitoring system is in compliance with the information (meters and lines) reported in the MR (ref 6d). However it was verified as well that the monitoring system has a new meter involved (located in Chuspipata sub-station), the cited meter was installed in order to comply with the mandate of the local authority. Please see the details below in section 3.2.3.
- (c) No information provided in the Monitoring Report (ref. 6d) differs from the revised PDD (ref. 1d).
- (d) The emissions reduction reached in the current monitoring period (CP2 MP2) are approximately 15% higher compared with the estimations of the registered PDD page 6 (ref. 1a). The PP was requested to clarify how the ex-ante estimation of the ER was done in the MR (ref 6a). **CAR 2, item 7 was raised.** The PP clarified that the ex-ante estimation was done considering the expected generation per month; it means taking into account the seasonal effect. This corresponds to the generation used during the validation stage (ref 92) and it was obtained from SDDP used by the CNDC. The information reported by the PP in the answer is consistent with the rainy season (summer) in Bolivia (ref 55). It was verified that the expected annual generation (from July to June) is 309 GWh/year, which is the same value reported in the registered PDD (ref 1a). Therefore considering the approach followed by the PP, the expected generation for the period March 2011 – June 2012 was 409.51 GWh. It was verified that the MR version 3 (ref 6c), table 6.1., reports the expected energy generation and the value achieved separated in two parts from March 2011 to June 2011 and one year period from July 2011 to June 2012.

The difference between the estimated and reached ER for this monitoring period are explained by:

- The difference in the value of the grid emission factor. As per the registered PDD (ref 1a), the expected combined emission factor is 0.61 tCO₂/MWh, while the average value reached in the monitoring period was 0.63 tCO₂/MWh (average).
- The difference in the energy generation. As per the registered PDD (ref 1a), the expected energy generation for a period equivalent to the monitoring period length was 409,510 MWh, while the value reached in the monitoring period was 452,317 MWh, which is 10% more than the expected. During the site visit the historical electricity generation was reviewed. It was verified that the period under verification corresponds to the one with best load factor.

It was verified that the higher amount of electricity generated (10%) does not affect the project additionality. As per the registered PDD (ref 1a), the project supports its additionality on Investment Analysis and Barriers. Regarding the investment analysis, as per registered PDD (ref 1a) page 13, “Base case I: 10% of increase in Energy Revenue” represents a IRR of 18.5%, which is under the benchmark rate defined (20%). During this monitoring period the project generated 10% more of the energy expected, for the investment analysis it is equivalent to the base case I. Therefore it can be confirmed that the project additionality is not affected by the better performance of the project.

Therefore all the conditions faced in the current MP lead to reach a higher amount of ERs in comparison with the registered PDD. **CAR 2 item 7 closed.**

- (e) During the site visit, it was found that there are 3 emergency generators (1 in Yanacachi, 1 in Chojlla and 1 in the pondage). The PP was requested to provide the information of the diesel consumption of the given generators. **CL 5 was raised.**

It was verified that the diesel consumption of the emergency generators was not considered during the time of validation, which is correct against the principle *"The validation report shall contain information regarding greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed CDM project activity which are expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology."* (VVM version 1.1. valid at the time of the renewal of the crediting period).

As per ACM0002 version 8, PE = 0. Additionally it can be highlighted that ACM0002 version 13 states *"The use of fossil fuels for the back up or emergency purposes (e.g. diesel generators) can be neglected."* In order to validate that the emissions due to the diesel combusted by the emergency (back up) generators can be neglected, it was verified (as described in the following paragraphs) that they are less than 1% of the estimated project ER.

It was verified that the PP records the diesel consumption in the form "Kardex de control de combustibles y lubricantes" (control record of fuel and lubricant) (ref 74). It was verified that the diesel consumption summarised by the PP in the answer of the finding is correct against the records (ref 74). The PP provided an estimation of the emissions linked to the CO₂ emissions by the operation of the emergency (backup) generators. The estimation was done following the "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" (EB 41 annex 11) in the file "EmergencyGen.xlsx" (ref 75). As per the PP calculation, the emissions during a one year period (01/07/2011-30/06/2012) were 8.15 tCO₂, which represent 0.004% of the expected ER of the project. The data used and the calculation done by the PP were reviewed and found correct.

Therefore considering that the emissions by diesel consumption at the emergency generators are lower than 1% of the emission reductions and the approach of ACM0002 (version 8 and 13), it is deemed correct to leave aside the emissions due to the diesel consumption of the emergency generators. **CL 5 was closed.**

The final version of the MR (version 4) is dated 06/02/2013 (ref 6d). This final version of the MR (ref 6d) covers all the changes made to the previous versions of the MR. The present report mentions the different versions/stages of the MR where the specific comments or requirements were closed (not necessarily the last version of the MR). This criterion applies for all the documents indicated throughout the report.

3.2 Post registration changes

During the second monitoring period five permanent changes were assessed, i) the amendment of the monitoring frequency of the parameter $EG_{m/n,y}$, ii) the change of the node where the HB's injections are accounted and iii) inclusion of parameter $EF_{grid,CM}$ in the monitoring plan, iv) amendment in the application of the calculation procedure linked to the units in top of the dispatch and v) elimination of the parameter "Average net energy conversion efficiency of power unit m in year y" ($\eta_{m,y}$) from the Monitoring Plan. As it is assessed and reported in section 3.2.3. and 3.2.4 the changes do not require prior approval as per Annex 1 of the Project Standard version 2 and the changes are deemed correct against the applicable methodology and Tool.

3.2.1 Temporary deviations from registered monitoring plan or applied methodology

No temporary deviations were found and assessed during the monitoring period under assessment.

3.2.2 Corrections

No corrections to the PDD were found and assessed during the monitoring period under assessment.

3.2.3 Permanent changes from registered monitoring plan or applied methodology

During the second monitoring period of the second crediting period two permanent changes to the Monitoring Plan were assessed; i) the amendment of the monitoring frequency of the parameter $EG_{m/n,y}$ and ii) the change of the node where the HB's injections are accounted.

i) Amendment of the monitoring frequency of the parameter $EG_{m/n,y}$.

The monitoring frequency defined for parameter $EG_{m/n,y}$ in the Monitoring Plan (ref 1a) is not in compliance with the Tool to calculate the emission factor for an electricity system version 1.1 (ref 5). **CAR 1, item 1 was raised.**

Given the inconsistency found in the monitoring frequency, the PP updated the Monitoring Plan (PDD section B.7.1, ref 1b). It was validated that the parameter was duly corrected and it is now in compliance with the Tool to calculate the grid emission factor version 1.1. It is important to highlight that this change in the Monitoring Plan does not have impact over the monitoring system implemented because (in this MP and previous ones) the parameter has always been monitored as per the frequency required (hourly) but the monitoring frequency was wrongly defined in the registered PDD (ref 1a).

According to the data reviewed (refs. 10a, 11a, 12a, 13a & 15a), it was verified that the data of the parameter $EG_{m/n,y}$ is measured with the frequency defined in the revised MP/PDD (ref 1b). Thus the permanent change is included in updated PDD (ref 1a), page 35, it is only an amendment because the data has always been available as per the Tool (ref 5) requirements. On the other hand, it is worth mentioning that $EG_{m/n,y}$ is obtained from the CNDC (grid operator), thus it is not monitored directly by the PP.

The change in the monitoring frequency of $EG_{m/n,y}$ does not require prior approval because as per Annex 1 of the PS version 2.1 the changes introduced are classified under paragraph 5a "*Change of calibration frequency or practice for monitoring equipment not within the control of project participants*". As it was mentioned before, the parameter $EG_{m/n,y}$ is obtained from the grid operator (CNDC) who monitored the generation of every power plant of the system. On the other hand, the change is only an amendment on the MP because in practice, the monitoring frequency has always been in compliance with the Tool (ref 5) requirements.

Additionally it was verified that the change does comply with PS version 2.1 (ref 7), section 4, paragraph 6a-c "*Proposed or actual changes to the project design of a registered CDM project activity that do not adversely impact any of the following do not require prior approval by the Board*":

- (a) *The applicability and application of the applied methodology under which the project activity has been registered*; the project follows ACM0002 version 8 and Tool to calculate the grid emission factor version 1.1, both duly approved by the EB. The change introduced does not involve a change in the applicable methodology or the Tool.
- (b) *The additionality of the project activity*; the change does not have any impact in the additionality because is an amendment in the MP.
- (c) *The scale of the project activity*; the project classifies as a "large scale project", the change introduced does not have any impact in the project scale.

Given the nature of the change (amendment of a monitoring frequency) and knowing that this is only an amendment to formalise the monitoring plan, because the monitoring frequency implemented has been in accordance with the Tool requirement (ref 5), it can be affirmed that this change does not have an impact over the previous monitoring period or the ex-ante estimations..

Based on the information assessed and validated it can be confirmed that the change is correct and in compliance with Project Standard version 2.1 and Verification and Validation Standard version 3. The revised PDD/MP (ref 1d) contains the cited change on page 35, the document is provided in a clean and track change mode.

ii) Change of the node of HB's injections

As per MR version 1 (ref 6a), parameter $EG_{PJ,h}$, a new meter of HB is located in "Chuspipata" sub-station. During the site visit it was found that the injection point of the project was changed from Kenko Node to Chuspipata Node. In order to assess the related information and address the changes as per VVS version 3 and PS version 2 **CAR 6 was raised.**

The MR (ref 6b) section C, includes a diagram with the relevant points related to the monitoring system of the energy generated and injected to the grid by HB. The cited diagram shows "Chuspipata Sub-station". It was verified that as per the Supreme Decree 488 (ref 78) issued on 28/04/2010, the lines "Chuquiaguillo-Chuspipata" and "Chuspipata-Caranavi" were incorporated to the interconnected system.. Similarly it was verified as per the CNDC report N°23, issued on 18/05/2010 (ref 79), that the injections of Hidroelectrica Boliviana will be considered at Chuspipata instead of Kenko. It was also verified that the CNDC (grid operator) formalised in the Document of economic transactions (ref 83)) from 01/05/2012 the SMEC (system of commercial measurements) which recognises the meter located in Chuspipata sub-station as the valid one to measure the injections from line Pichu, which transport the energy generated by Hidroelectrica Boliviana.

Based on the information previously validated the changes introduced to PDD (ref 1c) on pages 34&35 are deemed correct. The new text in the Monitoring Plan (Ref 1c, section B.7.1) read as *"HB's injections at node of the Trunk Integrated Grid for HB, where its billing is referred to, are measured through the Commercial Recording System, a meters' system remotely accessed from HB's and CNDC's premises. This data is hourly measured and monthly recorded. Project's deliveries at Pichu substation is measured through HB's own metering system and used to deduct from measurement records at node of the Trunk Integrated Grid..."*. The new text is deemed correct because it refers to the node of injection used for the billing process as the one considered for the monitoring. It is important to notice that the text does not mention a specific node because it could change in the future according to the authority requirements as it has done. (ref 78, 79 & 83).

From the operational point of view it was verified against the formal notification to the CNDC (ref 80) that the meter Itron s/n 53120604 was installed on 30/04/2012 in Chuspipata sub-station and has become the formal meter for the SMEC from 01/05/2012. The information is consistent and correct against the DTE (ref 83). It was also verified that the new meter involved (located in Chuspipata) has the same accuracy (class 0.2) (ref 27, 80 & 82) as the meters previously involved in the monitoring, therefore the change introduced in the Monitoring Plan does not reduce the accuracy of the measurements. It was found that meter s/n 53120604 was duly calibrated before entering into operation (ref 27&80).

It was verified that the change introduced to the Monitoring Plan in the PDD does not require prior approval because it complies with the Project Standard version 2.1, Annex 1, paragraph 5a &c. As it was verified and reported previously the change of the node that accounts the injections of Hidroelectrica Boliviana to the grid was mandated by law (ref 78) and executed according to the local regulation (ref 83). Therefore the change is not within the control of the project participant and is linked to the point considered for billing purposes. Additionally the change introduced is in compliance with ACM0002 version 8, where the parameter EG_y is defined as *"Electricity supplied by the project activity to the grid."*. Currently the project generation is injected and accounted in a new point (Chuspipata sub-station) of connection to the grid.

Additionally, it was validated that the change introduced does comply with the following aspects of the Project Standard version 2.1, Annex 1, paragraph 6a &c:

- a. *applicability and application of the methodology*, the change of the node where HB's injections are recorded is not related with the applicability conditions defined in ACM0002 version 8.

- b. *the additionality*, according with the line diagram available in the CNDC report N°32 (ref 79) Chuspipata node is closer to HB than Kenko node, therefore the HB has lower transmission losses accounting its injection in Chuspipata node.

As per the PP's information, the transmission losses decrease from approximately 6% to 3% and the marginal cost decreases from 19.5 US\$/MWh to 18.8 US\$/MWh. It was verified against the Node price report 2010 (that illustrate HB's injection in Kenko) and 2012 (that illustrate HB's injection in Chuspipata) (ref 85 and 86), that the transmission losses were 5.9% (gross generation - Kenko) and 2.8% (gross generation - Chuspipata). Similarly it was verified against the annual report issued by the CNDC (ref 40) that the energy price in Kenko node was 19.48 US\$/MWh, while in Chuspipata node was 18.85 US\$/MWh.

Based on the verified information it can be confirmed that the project incomes are lower accounting HB's injection in the Chuspipata node instead of the Kenko node. Because the losses are lower the PP receives a lower price. Therefore according to the following equation it was verified that the PP income will always be lower in Chuspipata node than in Kenko node.

$$\text{Incomes} = \text{Energy sold} * \text{Energy price}$$

Where:

$$\text{Incomes Kenko} = \text{Gross Energy} * (1 - 5.9/100) * 19.48$$

$$\text{Incomes Kenko} = \text{Gross Energy} * 18.33$$

$$\text{Incomes Chuspipata} = \text{Gross Energy} * (1 - 2.8/100) * 18.85$$

$$\text{Incomes Chuspipata} = \text{Gross Energy} * 18.32$$

Thus the difference of incomes is:

$$\begin{aligned} \text{Incomes difference (new - old)} &= \text{Incomes Chuspipata} - \text{Incomes Kenko} \\ &= \text{Gross Energy} * 18.32 - \text{Gross Energy} * 18.33 \\ &= - \text{Gross Energy} * 0.01 \end{aligned}$$

The PP is going to receive less income in the new injection point (Chuspipata) than in the original situation described in the registered PDD (ref 1a) that considered Kenko as injection point.

Therefore HB is not receiving more income due to the change in the node that accounts HB's injections to the grid, thus the project's profit is not improved and the additionality is not affected.

- c. *the scale of the project*, the change introduced does not relate to the installed capacity of the project, therefore the project continues as a large scale project.

Based on the information assessed and validated it can be confirmed that the change is correct and in compliance with Project Standard version 2.1 and Validation and Verification Standard version 3. The change does not involve a change in the calculation procedure. **CAR 6 was closed.** The revised PDD/MP (ref 1d) contains the cited change on pages 33&34, the document is provided in clean and track change mode.

Finally it was verified that the monitoring plan available in the revised PDD (ref 1d), which includes the assessed changes (i, ii), is in compliance with VVS version 3.0 (ref 4b) paragraph 234 "(a) *The monitoring plan has been properly implemented and followed by the project participants;* (b) *All parameters stated in the monitoring plan and relevant Board decisions have been monitored*".

3.2.4 Changes to project design of registered project activity

During the second monitoring period, in the second crediting year, three permanent changes to the PDD were assessed, iii) inclusion of parameter $EF_{\text{grid,CM}}$ in the monitoring plan, iv) the application of the calculation procedure linked to the units in top of the dispatch and v) elimination of the parameter "Average net energy conversion efficiency of power unit m in year y" ($\eta_{m,y}$) from the Monitoring Plan. It is worth noting that the three changes assessed and presented below are directly related with the monitoring plan of the project. However given that they do not fit exactly with Project Standard (ref 7), annex 1, section 3

(*Permanent changes from the registered monitoring plan or applied methodology*), these changes are presented and assessed under the guidance given in Project Standard (ref 7), annex 1, section 4 (*Changes to the project design of a registered project activity*).

iii) Inclusion of parameter $EF_{grid,CM}$ in the monitoring plan

It was found that the Monitoring Plan (ref 1a) contained in the registered PDD (ref 1a), does not contain the parameter $EF_{grid,CM}$ as required by ACM0002 version 8 on page 16. **CAR 1 item 3 was open.**

It was verified that all the sub-parameters to obtain $EF_{grid,CM}$ are included in the registered (ref 1a) and revised monitoring plan (ref 1d) but to keep consistency, the PP updated the monitoring plan to complete the PDD. It was verified that the parameter $EF_{grid,CM}$ in the revised MP (ref 1d) complies with the ACM0002 version 8 requirements and is calculated correctly.

The inclusion of the missing parameter ($EF_{grid,CM}$) does not require prior approval because as per Annex 1 of PS version 2.1, para 6a, the change does not adversely impact "*The applicability and application of the applied methodology under which the project activity has been registered.*". The change introduced (inclusion of omitted parameter) means the methodology has been applied correctly. It is worth mentioning that in the current and previous monitoring period, the $EF_{grid,CM}$ was correctly calculated and included in the monitoring report, thus the purpose of this change is to complete the monitoring plan.

Additionally it was validated that the change does comply with PS version 2.1, section 4, paragraph 6b-c "*Proposed or actual changes to the project design of a registered CDM project activity that do not adversely impact any of the following do not require prior approval by the Board*":

b. *The additionality of the project activity*; the change does not have any impact in the additionality because is an amendment in the MP.

c. *The scale of the project activity*; the project classifies as a "large scale project", the change introduced does not have any impact in the project scale.

CAR 1 item 3 was closed.

It can be affirmed that the change introduced in the monitoring plan does not affect the previous monitoring period because it is only a reporting change and the parameter has been calculated for each monitoring period, since it is essential in the ER calculation..

Based on the information assessed and validated it can be confirmed that the change is correct and in compliance with Project Standard version 2.1 and Validation and Verification Standard version 3. The revised PDD/MP (ref 1d) contains the cited change on page 39, the document is provided in clean and track change mode.

iv) amendment in the application of the calculation procedure linked to the units in top of the dispatch

As part of the assessment, the PP was requested to clarify where in the calculation files it defined the percentage (x%) that corresponds to the top of the dispatch, as per the requirement of the Tool to calculate the grid emission factor version 1.1 (ref 5). **CL 4 was raised.**

As per the information received from the PP, 10% was assumed as the x% that includes the units in the top of total electricity dispatched in the hour, in order to comply with the Tool (ref 5). It was verified that the registered PDD (page 28, ref 1a) incorrectly reported the calculation procedure. Thus as per the Project Standard annex 1, the PP introduced the corresponding change in the PDD (page 28, ref 1c). It was verified that the calculation procedure described in the revised PDD (ref 1c) is correct against the Tool to calculate the grid emission factor version 1.1 (page 12, ref 5). Thus to define the units at the top (x%) of the dispatch it will be considered the higher value between 10% and the quantity of electricity displaced by the project activity during hour (h) divided by the total electricity generation in the grid during that hour h.

It was verified that the PP correctly included the comparison between 10% and the quantity of electricity displaced by the project per hour in the calculation files (ref 10c, 11c, 12c and 13c). The excel files corresponding to references 10c, 11c, 12c and 13c, tab "HierMWh x%", column CC contain the x%,

which is the maximum between 10% and the quantity of electricity displaced by the project per hour. Later the x% is used to define the units in the top of the dispatch.

The change introduced to the PDD does not require prior approval because as per Annex 1 of PS version 2.1 the change does not adversely impact *“the applicability and application of the applied methodology under which the project activity has been registered”*. Therefore it is in compliance with PS (EB 70 annex 2), section 4, paragraph 6a. As previously described, the change introduced was done to follow the calculation procedure as it is defined by the applicable Tool (ref 5). Therefore, the revised PDD (ref 1c) correctly follows the application requirements of ACM0002 version 8 (ref 3) and the Tool to calculate the grid emission factor version 1.1 (ref 5).

It was validated that the change does comply with the PS (EB 70 annex 2), section 4, paragraphs 6b&c *“Proposed or actual changes to the project design of a registered CDM project activity that do not adversely impact any of the following do not require prior approval by the Board”*:

- *The additionality of the project activity*; the change does not have any impact in the additionality because it is an amendment in the calculation procedure to correctly follow the applicable methodology and Tool (ref 5)..
- *The scale of the project activity*; the project is classified as a “large scale project”. The change introduced does not have any impact on the project scale.

The impact of the change over the previous monitoring period was reviewed by the assessment team. It was verified that the change introduced, did not have an impact over the EFom determined ex-ante at the renewal of the crediting period. The PP provided the revised EFgrid calculation file (ref 87b), applying the correct procedure to determine the units at the top of the dispatch. These files were reviewed and it was verified that the calculation used is correct. Since most of the time the project generation in each hour is less than 10% of the total generation of the grid in the same hour (ref 87b), the net effect on the EFom is small and it had effect over the 3rd significant figure, therefore the EFom did not vary.

It was verified that the amendment does not have an impact on the ER calculation done for the previous monitoring period (CP2 MP1). The revised calculation files (ref 87c) provided by the PP, were reviewed by the assessment team. It was verified that the data contained in the cited files, is the same data used in the calculation files available in the project web page for CP2 MP1 and that the amendment done in the calculation does not have an impact over the final EFom. As in the previous case the difference was in the 3rd significant figure and the values were rounded to two figures, thus no difference was found and there was no impact on the ER of the previous MP.

The updated calculation files of the current monitoring period were assessed (ref 10c, 11c, 12c, 13c and 14c). It was verified that the EFom, obtained applying the correct procedure to determine the projects in the top of the dispatch, had an insignificant variation (in the 3rd significant figure) and does not affect because the figures were already rounded to two significant figures.

Thus, based on the information assessed and validated it can be confirmed that the change is correct and in compliance with Project Standard version 2 and Verification and Validation Standard version 3, **CL 4 was closed**. The revised PDD/MP (ref 1d) page 28 contains the cited change, the document is provided as clean and track change mode.

v) elimination of the parameter “Average net energy conversion efficiency of power unit m in year y” ($\eta_{m,y}$) from the Monitoring Plan

During the verification process it was found that the parameter “Average net energy conversion efficiency of power unit m in year y” ($\eta_{m,y}$) was included in the Monitoring Plan, however as per the “Tool to calculate the emission factor for an electricity system” version 1.1, the cited parameter is not applicable for the project. **CAR 1 item 4 was raised**.

The PP removed the parameter $\eta_{m,y}$ from the monitoring plan, this change introduced to the PDD does not require prior approval because as per Annex 1 of the PS version 2.1 the change does not adversely impact *“the applicability and application of the applied methodology under which the project activity has been registered”*, thus it is in compliance with the PS, section 4, paragraph 6a. The change introduced only corresponds to the proper application of the Tool to calculate the emission factor for an electricity system” version 1.1. It was validated that the parameter is not applicable for the project, because the parameter $\eta_{m,y}$ is required for option B.2. to calculate the $EF_{EL;m,y}$, however the project uses option B1, thus the parameter is not required. Therefore, the revised PDD (ref 1d) follows correctly the application requirements of ACM0002 version 8 (ref 3) and the Tool to calculate the grid emission factor version 1.1 (ref 5).

On the other hand it was validated as well that the change complies with PS (EB 70 annex 2), section 4, paragraphs 6b&c *“Proposed or actual changes to the project design of a registered CDM project activity that do not adversely impact any of the following do not require prior approval by the Board”*:

- *The additionality of the project activity*; the change does not have any impact in the additionality because is an amendment in the list of monitored parameters. The parameter removed from the MP is not required by the project as per the applicable Tool.
- *The scale of the project activity*; the project classifies as a “large scale project”, the change introduced does not have any impact in the project scale.

the verification team assessed the impact of the change over the previous monitoring period, and it was found that it had no impact because the parameter removed is not required by the applicable Tool (ref 5) and this parameter is not required for the ER calculations.

Finally it was verified that the monitoring plan available in the revised PDD (ref 1d), page 38, which includes the assessed changes (iii, iv, v), is in compliance with VVS (ref 4b) paragraph 234 *“(a) The monitoring plan has been properly implemented and followed by the project participants; (b) All parameters stated in the monitoring plan and relevant Board decisions have been monitored”*. **CAR 1 item 4 was closed.**

3.2.5 Changes to start date of crediting period

No changes to the start date of the crediting period apply for the monitoring period under assessment.

3.3 Remaining Issues, CAR's, FAR's from Previous Validation or Verification

Not applicable, no open issues from the previous verifications (ref. 9) and the validation (ref. 2).

3.4 Completeness and accuracy of Monitoring

3.4.1 Verification of monitoring of parameters

The monitoring plan implemented by the project is in accordance with the applied methodology. During the site visit it was confirmed that the project follows the revised monitoring plan correctly (ref 1d).

In the previous crediting period the methodology applicable was ACM0002 version 6. That version of the methodology indicates that the dispatch data analysis was the first methodological choice. Currently the tool (ref. 5) does not mention any preferable option, but the PP continues to apply the dispatch data analysis in order to be consistent with the first crediting period.

During this crediting period the parameters were monitored according to the monitoring methodology ACM0002 version 8 (ref. 3) and the applicable “Tool to calculate the emission factor for an electricity system” v1.1 (ref. 5). However as it was reported in the previous section 3.2.3., the monitoring frequency defined in the Monitoring Plan of the registered PDD (ref 1a) for parameter $EG_{m/n,y}$ *“monthly measured y and yearly recorded”* is not in compliance with the Tool to calculate the emission factor for an electricity system version 1.1 (ref 5), as it requires monitoring *“hourly”*. Similarly it was found that the parameter $EF_{grid,CM}$ is omitted in the monitoring plan of the registered PDD (ref 1a), while it should be included in the

list of monitored parameters.

For this reason in the current verification process, post registration changes have been assessed, the changes do not require prior approval because they are in compliance with the PS version 2.1 paragraph 5a and 6a respectively. The change in the monitoring frequency of $EG_{m/n,y}$ does not require prior approval because the parameter $EG_{m/n,y}$ is monitored by and obtained from a third independent and formal party, the grid operator (CNDG). The inclusion of $EF_{grid,CM}$ allows to complete the monitoring plan doing a correct application of the ACM0002 version 8.

The PP updated the Monitoring Plan (PDD section B.7.1, ref 1d) to address above identified issues. It was validated that the parameter $EG_{m/n,y}$ was duly amended in the revised MP (PDD section B.7.1, ref 1c) and it is now in compliance with the Tool to calculate the grid emission factor version 1.1. This change introduced into the Monitoring Plan does not have impact over the monitoring system implemented because always (in this MP and previous ones) the parameter has been monitored and reported as per the frequency required (hourly), but the monitoring frequency was wrongly defined in the registered PDD (ref 1a). Additionally it is important to mention that the parameter $EG_{m/n,y}$ is obtained from the CNDG (grid operator) who monitor the parameter remotely from the set of meters that are part of the SMEC, thus the parameter is not monitored directly by the PP.

Similarly it was validated that the revised MP (ref 1c) includes correctly the parameter $EF_{grid,CM}$. As It was assessed and reported previously, the $EF_{grid,CM}$ has been correctly calculated and included in the MR during this and previous verifications.

According with the data reviewed (refs. 10a, 11a, 12a, 13a & 15a), it was verified that the data of the parameter $EG_{m/n,y}$ is measured with the frequency defined in the corrected MP/PDD (ref 1d). The parameter $EF_{grid,CM}$ is correctly included in the MR version 4 (ref 6d) section B.7.1. Thus the permanent changes included in the updated PDD (ref 1d), pages 35 and 39, are only an amendment because always the data has been available as per the Tool (ref 5) and ACM0002 version (ref 3) requirements.

It is concluded that the parameters included in the revised monitoring plan (ref. 1d) have been monitored according to the monitoring methodology ACM0002 version 8 (ref. 3) and the applicable "Tool to calculate the emission factor for an electricity system" v1.1 (ref. 5). The tables below contains the individual assessment for each parameter.

Parameters related to ACM0002 version 8 (ref 3).

Methodology Revised PDD MR Item	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Data/Parameter	1. <i>wMain, CO2</i> 2. <i>wMain, CH4</i> 3. <i>MS,y</i>	n/a	n/a	Not applicable. These parameters are applicable for geothermal power plants. Thus, they are not applicable for the project activity which is an run-of-river hydropower plant. Therefore these parameters have been correctly left aside in the Monitoring Plan available in the registered (ref 1a) and revised PDD (ref 1d).
Description	1. Average mass fraction of carbon dioxide in the produced steam. 2. Average mass fraction of methane in the produced steam. 3. Quantity of steam produced during the year y.	n/a	n/a	
Measured/Calculated /Default		n/a	n/a	
Source of data		n/a	n/a	
Monitoring equipment		n/a	n/a	
Measuring/Reading/Recording frequency		n/a	n/a	
Calculation method (if applicable)		n/a	n/a	
QA/QC procedures		n/a	n/a	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology																														
Data/Parameter	EG _y	EG _{PJ, h}	EG _{PJ, h}	The name is not exactly the same, because the same parameter is used by the Methodology and the Tool and they named it differently, thus it is deemed correct. In compliance.																														
Description	Electricity supplied by the project activity to the grid.	Electricity displaced by the Project activity in hour <i>h</i> of year <i>y</i>	Electricity displaced by the Project activity in hour <i>h</i> of year <i>y</i>	The text is equivalent. In compliance.																														
Measured/Calculated /Default	--	Measured	Measured/calculated	In compliance																														
Source of data	Project activity site.	HB's measuring system and SMEC records.	Metering system readings and logbooks.	In compliance																														
Monitoring equipment	--	Meter's system.	<table><tr><td>Location</td><td>Meter</td><td>s/n</td></tr><tr><td>Chojlla</td><td>SEL-734</td><td>2008232369</td></tr><tr><td>Yanacachi</td><td>SEL-734</td><td>2008232367</td></tr><tr><td>Chojlla Antigua 1 *</td><td>SEL-734</td><td>2006338412</td></tr><tr><td>Chojlla Antigua 2*</td><td>SEL-734</td><td>2006338410</td></tr><tr><td>Chojlla Antigua 1</td><td>SEL-734</td><td>2008232368</td></tr><tr><td>Chojlla Antigua 2</td><td>SEL-734</td><td>2006338411</td></tr><tr><td>Chojlla in Pichu</td><td>JEMSTAR</td><td>012300419</td></tr><tr><td>Yanacachi in Pichu</td><td>JEMSTAR</td><td>012300420</td></tr><tr><td>HB in Chuspipata**</td><td>ITRON</td><td>53120604</td></tr></table> *: These meters were used from March 01, 2011 to March 18, 2011. **: operating since 01/05/2012	Location	Meter	s/n	Chojlla	SEL-734	2008232369	Yanacachi	SEL-734	2008232367	Chojlla Antigua 1 *	SEL-734	2006338412	Chojlla Antigua 2*	SEL-734	2006338410	Chojlla Antigua 1	SEL-734	2008232368	Chojlla Antigua 2	SEL-734	2006338411	Chojlla in Pichu	JEMSTAR	012300419	Yanacachi in Pichu	JEMSTAR	012300420	HB in Chuspipata**	ITRON	53120604	In compliance
Location	Meter	s/n																																
Chojlla	SEL-734	2008232369																																
Yanacachi	SEL-734	2008232367																																
Chojlla Antigua 1 *	SEL-734	2006338412																																
Chojlla Antigua 2*	SEL-734	2006338410																																
Chojlla Antigua 1	SEL-734	2008232368																																
Chojlla Antigua 2	SEL-734	2006338411																																
Chojlla in Pichu	JEMSTAR	012300419																																
Yanacachi in Pichu	JEMSTAR	012300420																																
HB in Chuspipata**	ITRON	53120604																																
Measuring/Reading/ Recording frequency	Hourly measurement and monthly recording	This data is hourly measured and monthly recorded.	Measured continuously, recording hourly, aggregated monthly	In compliance																														

Calculation method (if applicable)	--	1. Project's energy measured at Pichu through HB's metering system is affected by the transmission losses between the plants and Pichu to obtain the Project's gross production 2. Chojlla Antigua (HB's non-Project power source) gross production measured at generator's terminals through HB's metering system is added to the result above 3. Project's gross production is divided by the total gross production above to get the proportion of Project's generation of the total injections 4. The above proportion is applied to Kenko records from monthly SMEC for getting the Project's injection at Kenko (EG)	1. The project's energy is measured at Pichu through HB's metering system is affected by the transmission losses between the plants and Pichu to obtain the Project's gross production. 2. Chojlla Antigua (HB's non-Project power source) gross production measured at generator's terminals through HB's metering system is added to the result above. 3. Project's gross production is divided by the total gross production above to get the proportion of Project's generation of the total injections. 4. The above proportion is applied to Kenko records from monthly SMEC for getting the Project's injection at Kenko (EG)	Ok, PDD includes a procedure to deduct the energy generated by Chojlla Antigua that is not part of the CDM project. The same procedure was presented and approved for UNFCCC during the first crediting period as part of a RMP. In compliance . Please see the detailed assessment of the parameter below this table. In compliance .
QA/QC procedures	Electricity supplied by the project activity to the grid. Double check by receipt of sales.	Double check by audit of sales receipt. Sales are calculated by the CNDC and reported in the Monthly Economic Transactions Report (DTE by its acronym in Spanish).	Double check by the audit of sales receipt. Sales are calculated by the CNDC and reported in the Monthly Economic Transactions Report (DTE by its acronym in Spanish).	In compliance

The Project Participant measures the energy generated by the project using a set of meters that account and records the electricity generation. All the other parameters involved in the ER calculation are obtained from external sources, thus they are assessed individually below in section 3.5.

Based on the documents reviewed and the onsite inspection it is confirmed that the implementation of the monitoring system and procedures for this parameter comply with the monitoring system and procedures described in the revised monitoring plan (ref 1d), applied methodology (ref. 3) and tool (ref. 5).

The energy injection of the project activity to the grid ($EG_{y,i}$, $EG_{PJ,h}$) used for the ER calculations is obtained by deducting the energy generated by Chojlla Antigua (an electricity plant of 0.85 MW owned by HB, but not part of the CDM project) to the total HB's injection to the grid obtained through the Commercial Recording System of the CNDC in its SMEC monthly reports (ref. 37).

The SMEC accounts for Commercial Metering System from which sales reports are done by the CNDC; these spreadsheets contain the energy balance carried out by CNDC every 15 minutes in kW of all the power units connected to the SIN. The Monthly Economic Transactions Report (DTE) and the Daily Transactions Report (DT) contain the same information of the SMEC Reports, but the DTE provides a monthly summary and the DT a daily summary of the energy balance of the SIN.

The procedure followed by the PP to obtain the energy generated by the project and injected to the grid in the files “1.1) 11mar-11abr.xlsx” (ref 10c), “ 1.2) 11may-11oct.xlsx” (ref. 11c) and “ 1.3) 11nov-12abr.xlsx” (ref. 12c), “ 1.4) 12may-12jun.xlsx” (ref. 13c) sheet “EFx%” is correct against the procedure established in the registered and revised monitoring plan (ref 1a&1d). The procedure applied is equivalent to the following formula:

$$EG_y = MWh_{\text{Energy delivered to the grid by HB}} * \frac{Project_{\text{Gross Generation}}}{Total\ HB_{\text{Gross Generation}}}$$

Where:

- $MWh_{\text{Energy delivered to the grid by HB}}$ is the total HB's injection to the Interconnected Grid of Bolivia (SIN). This information is recorded in the SMEC monthly report (also known as sales receipt) (ref. 37), which registers the energy injected into the Bolivian grid by all the electricity companies. Said information is recorded by the CNDC and payment to the electrical companies is based on the information contained in these reports.

The information of the total energy injected to the grid hourly by HB, is provided by the PP in the spreadsheets “1.1) 11mar-11abr.xlsx” (ref 10c), “ 1.2) 11may-11oct.xlsx” (ref. 11c) and “ 1.3) 11nov-12abr.xlsx” (ref. 12c), “ 1.4) 12may-12jun.xlsx” (ref. 13c), (sheet “MWh”, column BY). The data reported in the cited file was cross checked against the average of the 4 registers of injections per hour (injection recorded every 15 minutes) provided by the CNDC in the files “SMEC Reports” or “sales receipt” (ref. 37). The crosscheck was done for the following days of the monitoring period under assessment and no errors were found:

Month	Days	Month	Days	Month	Days
Mar-2011	3, 4, 5, 6	Sep-2011	20, 21, 22, 30	Mar-2012	8, 18, 23, 31
Apr-2011	1, 15, 27, 29	Oct-2011	8, 11, 15, 21	Apr-2012	5, 6, 18, 20
May-2011	8, 12, 21, 23	Nov-2011	2, 13, 18, 30	May-2012	11, 24, 28, 31
Jun-2011	16, 17, 18, 19	Dec-2011	7, 9, 17, 26	Jun-2012	2, 25, 26, 28
Jul-2011	7, 13, 22, 23	Jan-2012	10, 14, 24, 28		
August-2011	5, 14, 17, 21	Feb-2012	4, 5, 20, 21,		

- $Project_{\text{Gross Generation}}$ is the electricity generation measured at the terminals of the CDM project activity generating units Yanacachi Norte and Chojlla. This hourly generation is reported by the PP in the file “b) HB GGEN 11mar-12jun.xlsx” (ref. 16d), sheet “mar11-jun12 GGen”, column H. The same file contains as well the gross generation of Chojlla Antigua (column F).
- $Total\ HB_{\text{GROSS GENERATION}}$, it is the sum of the Project Gross Generation and Chojlla Antigua Gross Generation (both measured at the terminals of each unit), which has been correctly calculated in the file “b) HB GGEN 11mar-12jun.xlsx” (ref. 16d), sheet “mar11-jun12 GGen”, column I.

The final values of the EG_y for ERs calculation purposes obtained are detailed in an hourly basis in the excel are included in the files “1.1) 11mar-11abr.xlsx” (ref 10c), “ 1.2) 11may-11oct.xlsx” (ref. 11c) and “ 1.3) 11nov-12abr.xlsx” (ref. 12c), “ 1.4) 12may-12jun.xlsx” (ref. 13c), (sheet “MWh”, column BY)., (sheet “EFx%”,

column I). The cited values are the SMEC records or sales receipt (ref. 17) after deducting the energy generated by Chojlla Antigua (using the steps defined in the registered and revised MP). The monthly summary of this data is used in the file "*2) Annex3 v4.0.xlsx (ref 14d)*", sheet "*OM Data*", column G. All the steps followed to get EGy were reviewed and found correct.

Regarding the meters involved with the parameter monitoring, they were inspected during the site visit and no evidence of damage, weakness or corrosion was observed by the assessment team. The information on the calibration frequency of this equipment is provided in section 3.6 below. During the verification process it was found that two meters (s/n 2006338412 & 2006338410) operated with a delayed calibration from 01/03/2011-18/03/2011. As it is detailed below, the PP applied correctly VVS paragraphs 238 a)&b), and the maximum error between the maximum permissible error of the instrument and the error found in the delayed calibration (ref 19&21) was applied. The maximum error (0.2%) is applied over "Old Chojlla 1&2" in a conservative manner from 01/03/2011 until 18/03/2011 in the calculation file named "b) HB GGEN 11mar-12jun.xlsx" (ref 16d), tab "mar11-jun12 GGen", cells Q2:R434.

Monitoring Report, onsite checks	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Revised Monitoring Plan & Approved Methodology				
Data/Parameter	EGexisting,y	n/a	n/a	Not applicable. This parameter is not monitored because in the injection point the meter records all the injections of Hidroelectrica Boliviana, it means Chojlla Antigua, Chojlla and Yanacachi. The registered PDD (and the previous CP) includes a calculation procedure using the gross generation at generator's terminals to deduct the generation of Chojlla Antigua for the ER calculation.
Description	The actual, measured electricity supplied to the grid by existing units in year y (MWh).	n/a	n/a	
Measured/Calculated /Default	--	n/a	n/a	
Source of data	This parameter will be zero except in the case where one or more of the existing units is/are not modified as part of the project activity, continue to operate after the implementation of the project activity, and the configuration permits their generation to be measured separately.	n/a	n/a	
Monitoring equipment	--	n/a	n/a	
Measuring/Reading/ Recording frequency	--	n/a	n/a	
Calculation method (if applicable)	Hourly measurement and monthly recording	n/a	n/a	
QA/QC procedures	--	n/a	n/a	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Data/Parameter	TEGy	n/a	n/a	Not applicable. This parameter is required for those hydro power projects whose Power density is more than 4 and less 10 W/m ² . As per the validation report (ref 2), the power density of the project is higher than 10 W/m ² , thus P _{Ey} =0 and the parameter TEGy is not required for the calculations and does not have to be monitored.
Description	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.	n/a	n/a	
Measured/Calculated /Default	--	n/a	n/a	
Source of data	Project activity site.	n/a	n/a	
Monitoring equipment	--	n/a	n/a	
Measuring/Reading/ Recording frequency	Hourly measurement and monthly recording	n/a	n/a	
Calculation method (if applicable)	--	n/a	n/a	
QA/QC procedures	--	n/a	n/a	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Data/Parameter	EF _{grid,CM,y}	EF _{grid,CM,y}	EF _{grid,CM,y}	Ok, all the sub-parameters to obtain EF _{cm} are included in the monitoring plan. EF _{bm} is fixed ex-ante. PP was requested to include the missing parameter EF _{grid,cm} in the MP. CAR 1 item 3 was raised. The revised PDD (ref 1c), section B.7.1 included correctly the required parameter. The version of the Tool considered is the
Description	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the version 01.1 of the "Tool to calculate the emission factor for an electricity system".	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the version 01.1 of the "Tool to calculate the emission	

			factor for an electricity system".	one valid at the renewal of the crediting period and duly identified in the registered PDD. Item closed. In compliance.
Measured/Calculated /Default	--	--	--	
Source of data	As per the "Tool to calculate the emission factor for an electricity system".	As per the "Tool to calculate the emission factor for an electricity system, version 01.1."	As per the "Tool to calculate the emission factor for an electricity system, version 01.1."	
Monitoring equipment		--	--	
Measuring/Reading/ Recording frequency		--	--	
Calculation method (if applicable)		As per the "Tool to calculate the emission factor for an electricity system, version 01.1".	As per the "Tool to calculate the emission factor for an electricity system, version 01.1".	
QA/QC procedures		The data can be cross checked with the baseline emissions calculation files	The data can be cross checked with the baseline emissions calculation files	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Data/Parameter	PE_{FC,j,y}	n/a	n/a	Not applicable. This parameter is related with the operation of geothermal power plants.
Description	CO2 emissions from fossil fuel combustion in process <i>j</i> during the year <i>y</i> (tCO2/yr). This parameter shall be calculated as per the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" where <i>j</i> stands for the processes required for the operation of the geothermal power plant.	n/a	n/a	
Meas./Calculated /Default	--	n/a	n/a	
Source of data	As per the "Tool to calculate the emission	n/a	n/a	

Monitoring equipment	factor for an electricity system".	n/a	n/a	
Measuring/Reading/Recording frequency		n/a	n/a	
Calculation method (if applicable)		n/a	n/a	
QA/QC procedures		n/a	n/a	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Data/Parameter	CapPJ	n/a	n/a	Not applicable. As it was validated (ref 2) the project is a run-of-river and the power density of the pondage is over 10 W/m2., thus PEy= 0. Therefore CAPpj and Apj are not required.
Description	Installed capacity of the hydro power plant after the implementation of the project activity.	n/a	n/a	
Measured/Calculated /Default	Determine the installed capacity based on recognized standards.	n/a	n/a	
Source of data	Project site.	n/a	n/a	
Monitoring equipment	--	n/a	n/a	
Measuring/Reading/Recording frequency	--	n/a	n/a	
Calculation method (if applicable)	--	n/a	n/a	
QA/QC procedures	--	n/a	n/a	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Methodology	Requirement in the applicable methodology and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the methodology
Data/Parameter	APJ	--	--	Not applicable. As it was validated (ref 2) the project is a run-of-river and the power density of the pondage is over 10 W/m2., thus P _{Ey} = 0. Therefore CAP _{pj} and Ap _j are not required.
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.	--	--	
Measured/Calculated /Default	-		--	
Source of data	Measured from topographical surveys, maps, satellite pictures, etc.	--	--	
Monitoring equipment	Project site.	--	--	
Measuring/Reading/ Recording frequency	-	--	--	
Calculation method (if applicable)	Yearly	--	--	
QA/QC procedures	-	--	--	

Parameters related to “Tool to calculate the emission factor for an electricity system”, version 1.1 (ref 5)

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	$FC_{i,m,y}$, $FC_{i,y}$, $FC_{i,j,y}$, $FC_{i,k,y}$, $FC_{i,n,y}$ and $FC_{i,n,h}$	$FC_{i,m/n,y}$	$FC_{i,m/n,y}$	In compliance
Description	Amount of fossil fuel type i consumed by power plant / unit m , j , k or n (or in the project electricity system in case of $FC_{i,y}$) in year y or hour h	Amount of fossil fuel type i consumed by power plant/ unit m or n in year y or hour h .	Amount of fossil fuel type i consumed by power plant/ unit m or n in year y or hour h .	In compliance
Measured/Calculated /Default	--	This data is calculated based in each generation thermal unit and the fuel consumption of each thermoelectric power plant.	Calculated	The Tool does not require any specification. The fuel consumption is obtained using data obtained from formal organizations. In compliance.
Source of data	Utility or government records or official publications	* SoE's (Superintendence of Electricity) ISE (Power Sector Information system) provides information on periodic – monthly and annual – fuel consumption by the thermoelectric plants and type of fuel by plant * Monthly SMEC records for injections information	AE's (Electricity Regulation and Social Control Authority) ISE (power sector information system) provides information on periodic – monthly and annual – fuel consumption by the thermoelectric plants and type of fuel by plant. Monthly SMEC records for injections information	In compliance
Monitoring equipment	--	--	--	--
Measuring/Reading/ Recording frequency	• Dispatch data OM: If available, hourly, otherwise annually for the year y in which the project activity is displacing grid electricity or, if available, hourly	For OM, the data is monitored monthly and recorded yearly.	For OM, the data is monitored monthly and recorded yearly.	In compliance
Calculation method (if applicable)	Applicable in the following cases: • Calculation of power unit emission factors ($EF_{EL,m,y}$, $EF_{EL,i,y}$, $EF_{EL,k,y}$ and	Calculation of power unit emission factors, as per equation (3).	This data is calculated based in each generation thermal unit and the fuel	Ok, it was confirmed by the CNDC (ref 33), that the plants are not obliged to record and provide the fuel consumption

	EF _{EL,n,y}), as per equation (3), in cases where fuel consumption data for the power unit is available; • Calculation of the hourly emission factor of plants in the top of the dispatch where hourly fuel consumption data is available, as per equation (9)		consumption of each thermoelectric plant.	hourly. In compliance.
QA/QC procedures	--	Official information made available by SoE's ISE reports is used. CNDC's reports are used for comparison ends only.		In compliance

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	NCV_{i,y}	NCVi	NCVi	In compliance
Description	Net calorific value (energy content) of fossil fuel type <i>i</i> in year <i>y</i>	Net calorific value (energy content) of fossil type <i>i</i> in year <i>y</i>	Net calorific value (energy content) of fossil type <i>i</i> in year <i>y</i>	In compliance
Measured/Calculated /Default	--	--	Measured	In compliance
Source of data	- Values provided by the fuel supplier of the power plant invoices - Regional or national average default values - IPCC default values	- Values provided by the fuel supplier of the power plant invoices - Regional or national average default values - IPCC default values	- Values from the local authority.	In compliance
Monitoring equipment	--	--	--	--
Measuring/Reading/ Recording frequency	• Dispatch data OM: <u>Annually</u> for the year <i>y</i> in which the project activity is displacing grid electricity or, if available, hourly • BM: For the first crediting period, either once ex-ante or annually ex-post, following the guidance included in step 4. For the second and third crediting period, only	For OM, the data is monthly monitored and yearly recorded. For BM, in the second crediting period, only once ex-ante at the start of the second crediting period and yearly recorded.	For OM, the data is monthly monitored and yearly recorded. For BM, in the second crediting period, only once ex-ante at the start of the second crediting period	In compliance

	once ex-ante at the start of the second crediting period.		and yearly recorded.	
Calculation method (if applicable)	• Calculation of power unit emission factors ($EF_{EL,m,y}$, $EF_{EL,j,y}$, $EF_{EL,k,y}$ and $EF_{EL,n,y}$), as per equation (3), in cases where fuel consumption data for the power unit is available; • Calculation of the hourly emission factor of plants in the top of the dispatch where hourly fuel consumption data is available, as per equation (9).	Calculation of power <i>unit</i> emission factors, as per equation (3).	--	In compliance
QA/QC procedures	--	Only official information made available by the CNDC is used.		In compliance

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	EF_{CO2,i,y} and EF_{CO2,m,i,y}	EF_{CO2,i,y}	EF_{CO2,i,y}	In compliance
Description	CO ₂ emission factor of fossil fuel type <i>i</i> in year <i>y</i>	CO ₂ emission factor per unit of energy of the fuel type <i>i</i> in year <i>y</i>	CO ₂ emission factor per unit of energy of the fuel type <i>i</i> in year <i>y</i>	In compliance
Measured/Calculated /Default	--	--	--	--
Source of data	- Values provided by the fuel supplier of the power plant invoices - Regional or national average default values - IPCC default values	- Values provided by the fuel supplier of the power plant invoices - Regional or national average default values - IPCC default values	- Values provided by the fuel supplier of the power plant invoices - Regional or national average default values - IPCC default values	In compliance
Monitoring equipment	--	--	--	--
Measuring/Reading/ Recording frequency	• Dispatch data OM: <u>Annually</u> for the year <i>y</i> in which the project activity is displacing grid electricity or, if available, hourly • BM: For the first crediting period, either once ex-ante or annually ex-post, following the guidance included in step 4. For the second and third crediting period, only once ex-ante at the start of the second crediting period.	For OM, the data is yearly monitored and yearly recorded. For BM, in the second crediting period, only once <i>ex-ante</i> at the start of the Second crediting period and yearly recorded.	For OM, the data is yearly monitored and yearly recorded. For BM, in the second crediting period, only once <i>ex-ante</i> at the start of the Second crediting period and yearly recorded.	In compliance
Calculation method (if applicable)	--	Calculated from carbon contents (made available by IPCC, 2006 Guidelines), conversion factor between Joule and BTU and relation of molecular masses of Carbon and Carbon Dioxide.	Calculated from carbon contents (made available by IPCC, 2006 Guidelines), conversion factor between Joule and BTU and relation of molecular masses of Carbon and Carbon Dioxide.	In compliance



QA/QC procedures	--	Only information from IPCC, 2006 is used		In compliance
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Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool.
Data/Parameter	EG_{m,y}, EG_{j,y}, EG_{i,y}, EG_{k,y} and EG_{n,h}	EG_{m/n/, y}	EG_{m/n/, y}	In compliance
Description	Net electricity generated and delivered to the grid by power plant / unit m, j, k or n (or in the project electricity system in case of EG _y) in year y or hour h	Net electricity generated and delivered to the grid by power plant / unit m or n in year y or hour h	Net electricity generated and delivered to the grid by power plant / unit m or n in year y or hour h	In compliance
Measured/Calculated /Default	--	Measured	Measured	In compliance
Source of data	Utility or government records or official publications.	CNDC's Daily Transactions report (DTr) or Post-dispatch report	Meters' system remotely accessed from the CNDC premises.	In compliance
Monitoring equipment	--	--	--	Ok, the parameter is obtained from CNDC who monitored the power plants generation.
Measuring/Reading/ Recording frequency	- Dispatch data OM: <u>Hourly</u> - BM: For the first crediting period, either once ex-ante or annually ex-post, following the guidance included in step 4. For the second and third crediting period, only once ex-ante at the start of the second crediting period.	As per registered PDD (ref 1a) - For OM, the data is monthly measured y and yearly recorded. As per revised PDD (ref 1b) - For OM, the data is hourly measured and monthly recording.	For OM, the data is hourly measured y and monthly recording.	The monitoring frequency defined in the Monitoring Plan (PDD) is not in compliance with the ACM0002 version 8, even though the information is already available. PP is requested to amend the MP. CAR 1 item 2 was raised. The monitoring plan available in revised PDD section B.7.1 (ref 1b) includes the correct monitoring frequency . CAR 1 item 2 was closed. In compliance
Calculation method (if applicable)	--	--	--	--
QA/QC procedures	--	The QA/QC procedures consist of verifying whether the data is used by the CNDC for transactional purposes related to the electricity market.	The QA/QC procedures consist of verifying whether the data is used by the CNDC for transactional purposes	In compliance

			related to the electricity market.	
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Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	EG_{PJ,h}	EG_{PJ, h}	EG_{PJ, h}	In compliance
Description	Electricity displaced by the project activity in hour <i>h</i> of year <i>y</i>	Electricity displaced by the Project activity in hour <i>h</i> of year <i>y</i>	Electricity displaced by the Project activity in hour <i>h</i> of year <i>y</i>	In compliance
Measured/Calculated /Default	--	Measured	Measured	In compliance
Source of data	As specified by the underlying methodology.	HB's measuring system and SMEC records.	HB's measuring system and SMEC records.	In compliance
Monitoring equipment	-	Meter's system.	Meter's system.	In compliance
Measuring/Reading/ Recording frequency	Hourly	This data is hourly measured and monthly recorded.	This data is hourly measured and monthly recorded.	In compliance
Calculation method (if applicable)	--	1. Project's energy measured at Pichu through HB's metering system is affected by the transmission losses between the plants and Pichu to obtain the Project's gross production 2. Chojlla Antigua (HB's non- Project power source) gross production measured at generator's terminals through HB's metering system is added to the result above 3. Project's gross production is divided by the total gross production above to get the proportion of Project's generation of the total injections 4. The above proportion is applied to Kenko records from	1. Project's energy measured at Pichu through HB's metering system is affected by the transmission losses between the plants and Pichu to obtain the Project's gross production 2. Chojlla Antigua (HB's non-Project power source) gross production measured at generator's terminals through HB's metering system is added to the result above 3. Project's gross production is divided by the total gross production above to get the proportion of Project's generation of	OK. The Tool does not refer to calculations method. The Calculation procedure included in the Monitoring plan is correct because allow deducting the energy generated by "Chojlla Antigua". The cited procedure was validated and approved at the time of renewal of the crediting period. This issue was covered during the first crediting period through a RMP: In compliance

		monthly SMEC for getting the Project's injection at Kenko (EG)	the total injections 4. The above proportion is applied to Kenko records from monthly SMEC for getting the Project's injection at Kenko (EG)	
QA/QC procedures	Double check by receipt of sales.	Double check by audit of sales receipt. Sales are calculated by the CNDC and reported in the Monthly Economic Transactions Report (DTE by its acronym in Spanish).	Double check by audit of sales receipt. Sales are calculated by the CNDC and reported in the Monthly Economic Transactions Report (DTE by its acronym in Spanish).	In compliance

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the Revised monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	$\eta_{m,y}$	--	n/a	During the verification process it was found that the parameter "Average net energy conversion efficiency of power unit m in year y" ($\eta_{m,y}$) was included in the Monitoring Plan, however as per the "Tool to calculate the emission factor for an electricity system" version 1.1, the cited parameter is not applicable for the project. CAR 1 item 4 was raised. The revised PDD (ref 1d) does not include the parameter $\eta_{m,y}$. It was validated that the parameter is not applicable, it is required for option B.2. to calculate the $EF_{EL;m,y}$, however the project uses option B1, thus the parameter is not required. It was validated as well that the change introduced to the PDD/MP does not require prior approval as per PS, annex 1, section 4. Item closed. Not applicable.
Description	Average net energy conversion efficiency of power unit m in year y	--	n/a	
Measured/Calculated /Default	--	--	n/a	
Source of data	Use either: - Documented manufacturer's specifications (if the efficiency of the plant is not significantly increased through retrofits or rehabilitations); or - Data from the utility, the dispatch centre or official records if it can be deemed reliable; or - The default values provided in the table below in annex 1.	--	n/a	
Monitoring equipment	--	--	n/a	
Measuring/Reading/ Recording frequency	Once for the crediting period	--	n/a	
Calculation method (if applicable)	--	--	n/a	
QA/QC procedures	If the data used is significantly lower than the default value of the applicable technology,	--	n/a	

Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	--	MERIT ORDER	MERIT ORDER	This parameter is not listed among the monitored parameters of the ACM0002 version 8 or the Tool to calculate the grid emission factor, however it was voluntary included in the PDD by the PP. This parameter is required for the EFom determination
Description	--	The merit order in which power plants are dispatched	The merit order in which power plants are dispatched	In compliance
Measured/Calculated /Default	--	Calculated.	Calculated.	Ok, the merit order is obtained after the hierarchisation of the plants as per the marginal cost.
Source of data	--	CNDC's Daily Transactions report (DTr) or Post-dispatch report.	CNDC's Daily Transactions report (DTr) or Post-dispatch report.	In compliance
Monitoring equipment	--	--	--	--
Measuring/Reading/ Recording frequency	--	For OM, merit order lists are registered hourly and recorded monthly.	Measured continuously, recording hourly, aggregated monthly.	In compliance
Calculation method (if applicable)	--	--	The merit order results from arranging all dispatched units in accordance to its marginal cost (which is at its time a combination of the heat rate, the fuel cost and the Operation & Maintenance non-fuel costs of the	In compliance

			Units), decreasingly. For OM, merit order lists are registered hourly and recorded monthly.	
QA/QC procedures	--	Only official information made available by CNDC has been used.	Only official information made available by CNDC has been used. CNDC establishes the merit order using models available to all agents of the power market. DTr are available from CNDC's web page and upon request.	In compliance

Monitoring Report, onsite checks	Requirement in the applicable Tool and relevant EB documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Revised Monitoring Plan & Approved Tool				
Data/Parameter	--	EGn/m/,y IMPORTS	EGn/m/,y IMPORTS	In compliance
Description	--	Electricity imports to the Project electricity system	Electricity imports to the Project electricity system	In compliance
Measured/Calculated /Default	--			In compliance
Source of data	--	Commercial Recording System and will be available from the CNDC	Commercial Recording System and will be available from the CNDC	In compliance
Monitoring equipment	--	If an interconnection to foreign grids occurs in the future, measurement will be done through the Commercial Recording System and will be available from the CNDC in accordance to the applicable Imports/Exports Regulation.	If an interconnection to foreign grids occurs in the future, measurement will be done through the Commercial Recording System and will be available from the CNDC in accordance to the applicable Imports/Exports Regulation. AE accomplishes the function of regulating the activities of the national electric industry, and has authority to approve electricity imports	In compliance
Measuring/Reading/ Recording frequency	--	This data will be monthly measured and yearly recorded.	This data will be monthly measured and yearly recorded.	In compliance
Calculation method (if applicable)	--	--	--	--
QA/QC procedures	--	Commercial metering and recording of generation will be	Commercial metering and recording of generation is	In compliance

		utilized. The QA/QC procedures will mainly consist of verifying whether the data is used by the CNDC for transactional purposes related to the electricity market.	used. QA/QC procedures mainly consist of verifying whether the data is used by the CNDC for transactional purposes related to the electricity market. No imports occur so far because there are no international links. No such a links are under development either.	
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Monitoring Report, onsite checks Revised Monitoring Plan & Approved Tool	Requirement in the applicable Tool and relevant EB documents	Requirement in the registered monitoring plan	Implementation of the project	Conclusion on the compliance of the monitoring plan in the PDD with the Tool
Data/Parameter	--	Plant (unit) name	Plant (unit) name	In compliance
Description	--	Identification of power source / plant for the Operating and Build Margins	Identification of power source / plant for the Operating and Build Margins	In compliance
Measured/Calculated /Default	--	--	--	--
Source of data	--	CNDC's DTr and DTE	CNDC's DTr and DTE	In compliance
Monitoring equipment	--	--	--	--
Measuring/Reading/ Recording frequency	--	This data is recorded yearly	This data is recorded yearly	In compliance
Calculation method (if applicable)	--	--	--	--
QA/QC procedures	--	Only official information made available by the CNDC is used	Only official information made available by the CNDC is used.	In compliance

Monitoring of reductions in GHG emissions resulting from the registered project have been implemented in accordance with the monitoring plan contained in the revised PDD, dated 06/02/2013 (ref 1d), which is consistent with ACM0002 version 8 (ref 3) and the Tool to calculate the grid emission factor version 1.1 (ref 5). The monitoring mechanism, including the data collection system, is effective and reliable. Thus it has been verified that the Monitoring Plan and its implementation is in compliance with VVS (ref 4b) paragraph 234 a-e.

According to the registered and revised PDD (ref. 1a & 1d) and the methodology ACM0002 version 8 (ref. 3) neither project emissions nor leakage effects need to be accounted for in this project activity.

3.4.2 Verification of implementation of sampling plan

No applicable, no sampling plan is applied as part of the monitoring procedure.

3.5 Accuracy of Equipment

The information related with the implementation of the monitoring system during the period under assessment is available in Monitoring report version 1 (ref 6a). It was reviewed, and some editorial mistakes (format to report dates, name of references, etc) were found, thus **CAR 2 items 1 to 5, 9 to 12, 14 and 15 were raised**. The PP provided an updated version 4 (ref 6d) where the mistakes were corrected. **CAR 2 items 1 to 5, 9 to 12, 14 and 15 were closed**.

All monitoring equipment specifications are evidenced by documentation presented by the PP. It was verified that the accuracy of the equipments is adequate for the project and it is in accordance with the monitoring plan and complies with the local regulation (the "Operative Norm N°8" (ref. 90) issued on 28/05/2010). As per the indications in the Operative Norm 8, no specific frequency for periodic calibration of the energy meters is required.

Additionally to the meters calibration done by the PP, the CNDC verifies the meters involved in the SMEC (for payment purposes) on site to corroborate the equipment accuracy. According with the information provided by the CNDC (ref. 33) the previous verification ordered to LACEEL by the CNDC was conducted on 2007 (ref. 34) and the last was conducted on 2010 (ref. 35).

The PP provided the calibration certificates of the involved meters, based on the information reviewed the following observation were **raised as CL3**.

1. The PP was requested to provide the calibration frequency recommended by the manufacturer of the energy meter (ITRON) located in Chuspipata.
2. As per MR version 1, the meters of Chojlla Antigua 1 & 2 (gross generation) were changed on March 2011. The PP was requested to revise the date of the change (meters s/n 2008232368 & 2006338411) and its consistency with the calibration certificates (ref 19 & 21) and provide the corresponding log books.
3. The PP was requested to provide the calibration certificate corresponding to the calibration done on 18/04/2011 to the meter serial number 2008232368 located in Chojlla Antigua 1 Generator terminal and on 31/08/2010 to to the meter serial number 2006338411 Chojlla Antigua 2 Generator terminal
4. It was found that meter Chojlla Antigua 1 Generator terminal, s/n 2006338412 operated with the calibration delayed from 19/03/2011-08/06/2011 and that that meter Chojlla Antigua 2 Generator terminal, s/n 2006338410 operated with the calibration delayed from 19/03/2011-08/06/2011. The PP was requested to clarify why the duly correction of data as per VVS paragraph 238 was not done.

Based on the reviewed and verified information **CL 3 was closed** as follow:

1. It was verified that the meter manufacturer acknowledge an operation period of 15 years without lost accuracy, and recommend to check the calibration every 4 years (ref 56 & 57). It was verified as well that the MR (ref 6b) was updated accordingly with the calibration frequency suggested by the manufacturer (4 years). **Item closed**.

2. During the site visit it was verified that the gross generation of Chojlla Antigua 1 & 2 was being measured by the meters s/n 2006338412 and s/n 2006338410 (ref 48, pic 6).
As per the information reported in the MR version 2 (ref 6b) the meters s/n 2008232368 & 2006338411, measured the generation in the cited point from 19/03/2011 to 08/07/2011, while meters s/n 2006338412 and s/n 2006338410 were in operation from 01/03/2011 to 18/03/2011 and from 08/07/2011 to 30/06/2012.
The dates of operation of each pair of meters were verified during the site visit against the daily reports and the generation records. In order to keep the information the PP provided a copy of the daily reports (ref 60 & 61) and the generation records (ref. 62 to 70). **Item closed.**
3. The missing calibration certificates (ref 46&47) were received, it was verified that the calibration dates of meters s/n 2008232368 and 2006338411 reported in the MR version 2 (ref 6b) are correct. **Item closed.**
4. As it was reported in item 2, the gross generation of Chojlla Antigua 1 & 2 was measured by the meters s/n 2006338412 and s/n 2006338410 (ref 48, pic 6) in the periods from 01/03/2011 to 18/03/2011 and from 08/07/2011 to 30/06/2012. Thus the MR version 1 (ref 6a) reported wrongly the operation period of these meters. **Item open.** According with the verified information, meters s/n 2006338412 & 2006338410 operated with a delayed calibration from 01/03/2011 until 18/03/2011. It was verified that the PP applied correctly VVS paragraph 238 a)&b)., and the maximum error between the maximum permissible error of the instrument and the error found in the delayed calibration (ref 19&21) was applied. The maximum error (0.2%) is applied over "Old Chojlla 1&2" in a conservative manner from 01/03/2011 until 18/03/2011 in the calculation file named "b) HB GGEN 11mar-12jun.xlsx" (ref 16b), tab "mar11-jun12 GGen", cells Q2:R434. **CL 3 item 4 closed.**

The calibration of the equipment is performed by an entity recognized by the relevant authority. The following table summarises the information reviewed and verified.

Monitoring equipment	Monitoring parameter	S/N	Type	Level	Calibration frequency requirement	Calibration date	Validity	Operation period	Are there delays in calibration?	Calibration Entity	Accreditation Certificate for the calibration entity / Issuing authority
Energy meter	EGPJ, h /Egy, Chojlla Generator terminal	2008232369	SEL-734	Class 0.2s	4 years (ref 30)	31-08-2010	30-08-2014	Whole MP, it was installed at site visit time (ref 48, pic 1)	No	Certificate 138/2010 issued by LACEEL on 06/09/2010 (ref 17)	IBMETRO (Bolivian institute of metrology)
Energy meter	EGPJ, h / Egy Yanacachi Generator terminal	2008232367	SEL-734	Class 0.2s	4 years (ref 30)	01-09-2010	31-08-2014	Whole MP, it was installed at site visit time (ref 48, pic 2)	No	Certificate 141/2010 issued by LACEEL on 06/09/2010 (ref 18)	IBMETRO (Bolivian institute of metrology)
Energy meter	EGPJ, h / Egy Chojlla in Pichu	12300419	Jemstar	Class 0.2s	3 years (ref 31)	30-08-2010	29-08-2013	Whole MP, it was installed at site visit time (ref 48, pic 3)	No	Certificate 136/2010 issued by LACEEL on 06/09/2010 (ref 23)	IBMETRO (Bolivian institute of metrology)
Energy meter	EGPJ, h / Egy Yanacachi in Pichu	12300420	Jemstar	Class 0.2s	3 years (ref 31)	30-08-2010	29-08-2013	Whole MP, it was installed at site visit time (ref 48, pic 4)	No	Certificate 135/2010 issued by LACEEL on 06/09/2010 (ref 24)	IBMETRO (Bolivian institute of metrology)
Energy meter	EGPJ, h / Egy HB in chuspipata	53120604	ITRON	Class 0.2s	4 years (ref 56)	26-04-2012	25-04-2016	Operating from 01/05/2012 (ref 80&83)	No	Certificate 268/2012 issued by LACEEL on 27/04/2012 (ref 27)	IBMETRO (Bolivian institute of metrology)

Monitoring equipment	Monitoring parameter	S/N	Type	Level	Calibration frequency requirement	Calibration date	Validity	Operation period	Are there delays in calibration ?	Calibration Entity	Accreditation Certificate for the calibration entity / Issuing authority
Energy meter	EGPJ, h / Egy Chojlla Antigua 1 Generator terminal	2006338 412	SEL-734	Class 0.2s	4 years (ref 30)	18-12-2006	17/12/2010	01/03/2011 – 18/03/2011 (ref 45, 60&61); and 08/07/2011 – onward it was operating at site visit time (ref 48, pic 6)	Yes, from 01/03/2011-18/03/2011	Certificate RMA R118 issued by SEL (ref 28)	Calibration entity is the equipment provider
						08-06-2011	07-06-2015			Certificate RMA 68545 issued by SEL (ref 19)	
		2008232 368	SEL-734	Class 0.2s	4 years (ref 30)	28-08-2008	27-08-2012	19/03/2011 – 08/07/2011 (ref 45, 60&61)	No	Certificate R125 issued by SEL (ref 20)	Calibration entity is the equipment provider
						18-04-2011	17-04-2015			Certificate 179/2011 issued by LACEEL (ref 47)	
Energy meter	EGPJ, h / Egy Chojlla Antigua 2 Generator terminal	2006338 410	SEL-734	Class 0.2s	4 years (ref 30)	12-12-2006	11/12/2010	01/03/2011 – 18/03/2011 (ref 45, 60&61) and, 08/07/2011 – onward it was operating at site visit time (ref 48, pic 6)	Yes, from 01/03/2011-18/03/2011	Certificate RMA 118 issued by SEL (ref 29)	Calibration entity is the equipment provider
						09-06-2011	08-06-2015			Certificate RMA 68545 issued by SEL (ref 21)	
		2006338 411	SEL-734	Class 0.2s	4 years (ref 30)	31-08-2010	30-08-2014	19/03/2011 – 08/07/2011 (ref 45, 60&61)	No	Certificate 137/2010 issued by LACEEL (ref 46)	IBMETRO (Bolivian institute of metrology)

Energy meter	EGPJ, h / EGy Chojlla Antigua 1&2 in Pichu	23201485	Jemstar	Class 0.2s	3 years (ref 31)	30-08-2010	29-08-2013	Whole MP, it was operating at site visit time (ref 48, pic 7)	No	Certificate 134/2010 issued by LACEEL (ref 25)	IBMETRO (Bolivian institute of metrology)
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3.6 Summary of compliance with the calibration frequency requirements for measuring instruments.

The calibration of the following measuring equipment (energy meters) has an impact on the claimed emission reductions:

- Energy meter, Chojlla Generator terminal (SEL 734) calibrated every 3-4 years. The last calibration was done on 31/08/2010 and is valid until 30/08/2014. Hence, there are no delayed calibrations.
- Energy meter, Yanachi Generator terminal (SEL 734) calibrated every 3-4 years. The last calibration was done on 01/09/2010 and is valid until 31/08/2014. Hence, there are no delayed calibrations.
- Energy meter, Chojlla Generator in Pichu (Jemstar) calibrated every 3 years. The last calibration was done on 30/08/2010 and is valid until 29/08/2014. Hence, there are no delayed calibrations.
- Energy meter, Yanacachi Generator in Pichu (Jemstar) calibrated every 3 years. The last calibration was done on 30/08/2010 and is valid until 29/08/2014. Hence, there are no delayed calibrations.
- Energy meter, HB in Chuspipata (Itron) calibrated every 4 years. The last calibration was done on 26/04/2012 and is valid until 25/04/2016. Hence, there are no delayed calibrations.
- Energy meter, Chojlla antigua 1 Generator terminal (SEL 734) calibrated every 3-4 years. During the monitoring period under assessment two meters were used. One unit operated without calibration from 01/03/2011-18/03/2011. It was verified that the PP applied correctly VVS paragraph 238 a)&b)., and the maximum error between the maximum permissible error of the instrument and the error found in the delayed calibration (ref 19&21) was applied. The meter installed at the site visit time was calibrated on 08/06/2011 and is valid until 07/06/2015.
- Energy meter, Chojlla antigua 2 Generator terminal (SEL 734) calibrated every 3-4 years. One unit operated without calibration from 01/03/2011-18/03/2011. It was verified that the PP applied correctly VVS paragraph 238 a)&b)., and the maximum error between the maximum permissible error of the instrument and the error found in the delayed calibration (ref 19&21) was applied. The meter installed at the site visit time was calibrated on 09/06/2011 and is valid until 08/06/2015.
- Energy meter, Chojlla antigua 1&2 Generators in Pichu (Jemstar) calibrated every 3 years. The last calibration was done on 30/08/2010 and is valid until 29/08/2014. Hence, there are no delayed calibrations.

3.7 Accuracy of Emission Reduction Calculations

The calculation of emission reductions is found to be correct after solving the comment raised as CL4. The response to CL4 was satisfactory and was closed. The details of the reported and the verified values for all parameters are listed in section 4, 'Calculation of Emission Reductions'.

The following indicates how the accuracy of the emission reduction calculations was verified:

- (a) All monitored data was available for the verification period and all the parameters were monitored in accordance with the revised monitoring plan (for further information, please see section 3.5.1 and 3.11 of this report).
- (b) The information of the meters is automatically registered by the PP and the CNDC, for this reason the data from the authority (CNDC) was requested by a letter through HB (ref. 32). CNDC provided a link to download the requested information (ref 33), to the audit team (this also includes external data e.g. NCV values).
- (c) For the calculation of the baseline emissions, appropriate methods and formulas indicated in the methodology ACM0002 version 8 (ref. 3) and the "Tool to calculate the emission factor for an electricity system" v1.1 (ref. 5) have been followed. Regarding project emissions or leakage, they do not need to be accounted for this project activity, according to the applied methodology.
- (d) The default values applied are properly justified through: calculations during the validation assessment, the methodology and/or the national authorities. These applicable values are detailed in section 3.11.

3.8 Quality of Evidence to Determine Emission Reductions

Critical parameters used for the determination of the Emission Reductions are discussed in section 3.4 above. All the data recorded is in compliance with the monitoring report.

3.9 Management and operational System and Quality Assurance

The company involved in the project (HB) has NOSA 5 Stars quality assurance system implemented (ref. 93) valid until 14/07/2012, additionally the PP has defined its internal procedures (ref. 89) in order to assure the quality of the information used and the values calculated and reported. The procedures identify the activities/actions responsible. During the site visit it was verified by the assessment team that the management system of the CDM project is properly carried out; therefore the assessment team confirm that the management system the CDM project is in place; with the responsibilities properly identified.

3.10 Data from External Sources

3.10.1 Net electricity generated and delivered to the grid by power plant/unit m or n in year y or hour h ($EG_{m/n, y}$) (MWh)

Through the review of the documents it can be confirmed that the procedures implemented to report this parameter comply the applied methodology (ref. 3) and tool (ref. 5). But the monitoring frequency defined for parameter $EG_{m/n, y}$ in the Monitoring Plan (ref 1a) was not in compliance with Tool to calculate the grid emission factor version 1.1. **CAR 1 Item 1 was previously raised and closed (section 3.2.3).** Similarly it was found that the type of data (measured/calculated/default) reported in MR (ref 6a) was wrong. **CAR 1 item 2 was raised.** It was verified that the mistake was corrected in MR version 2 (ref 6b), it is correctly stated that the parameter is measured. **CAR 1 item 2 was closed.**

Given the inconsistency found in the monitoring frequency, the PP updated the Monitoring Plan (PDD section B.7.1, ref 1b). It was validated that the parameter was duly corrected and it is now in compliance with the Tool to calculate the grid emission factor version 1.1. It is important to highlight that this change in the Monitoring Plan does not have impact over the monitoring system implemented because always (in this MP and previous ones) the parameter has been monitored as per the frequency required (hourly), but the monitoring frequency was wrongly defined in the registered PDD (ref 1a). This post registration changed was already assessed and discussed in section 3.2.3.

It was verified as well that the MR version 2 (ref 6b) was updated accordingly with the revised MP (ref 1b). The parameter is obtained from the grid operator (CNDC) who monitors and measure the energy generation of each power plant of the system and keeps the information online on <http://www.cndc.bo/home/index.php> for all the generators.

The electricity generated per each power plant/unit of the grid is collected from SMEC (Commercial Metering System) that records the energy injected by each unit to the grid. The values are based on the energy balance at each node of the grid, the meters are accessed remotely by the CNDC and the records are transmitted and managed by the SCADA (Supervisory Control And Data Acquisition, operated from the CNDC). The CNDC consolidates the information in *Daily Transaction Reports* (ref. 38) and Monthly Economic Transactions Reports ("*SMEC Reports*" ref. 37).

The "*SMEC Reports*" provides information on the electricity injection to the grid by each power plant/unit every 15 minutes, it is important to highlight that this corresponds to the information used to invoice the different companies. The CNDC provides in the "*Daily Transaction Reports*" the information of the electricity delivered by each power unit hourly.

The values used for the ERs calculations of the electricity delivered by the hydropower plants is taken directly from the SMEC Reports (ref. 37); but as the thermal power plant have different units, the PP elaborated a spreadsheet "*a) SMEC 11mar-12jun.xlsx*" (ref. 15c) to obtain the hourly injection of each thermal power unit of a power plant. For this calculation, the information of the "*Daily Transaction Reports*" (ref. 38) and *Monthly Economic Transactions Reports - SMEC Reports* (ref. 17) are used; applying the following formula:

$$MWh_{\text{Energy injected to the grid by each UNIT}} = \left(\frac{\text{Monthly SMEC injection}_{PLANT}}{\text{Post Dispatch}_{PLANT}} \right) * \text{Post Dispatch}_{UNIT}$$

The data of this parameter is retrieved by the PP from CNDC web site (only with a password); for this reason the Smec Reports (ref. 37) containing the whole data for this monitoring period was provided by the CNDC as per the assessments team request (ref.32).

The data reported by the PP in the excel file (ref 15c) was crosschecked against the information obtained from CNDC (ref 33) for the days listed in the following table, the data was found correct.

Month	Days	Month	Days	Month	Days
Mar-2011	3, 4, 5, 6	Sep-2011	20, 21, 22, 30	Mar-2012	8, 18, 23, 31
Apr-2011	1, 15, 27, 29	Oct-2011	8, 11, 15, 21	Apr-2012	5, 6, 18, 20
May-2011	8, 12, 21, 23	Nov-2011	2, 13, 18, 30	May-2012	11, 24, 28, 31
Jun-2011	16, 17, 18, 19	Dec-2011	7, 9, 17, 26	Jun-2012	2, 25, 26, 28
Jul-2011	7, 13, 22, 23	Jan-2012	10, 14, 24, 28		
August-2011	5, 14, 17, 21	Feb-2012	4, 5, 20, 21,		

Finally the parameter $EG_{m/n,y}$ is reported hourly per plant in references 10c, 11c, 12c and 13c sheet “MWh” for the calculation of the EF_{OM} . All the calculations were verified and found to be correct.

3.10.2 Amount of fossil fuel type *i* consumed by power plant / unit *m* or *n* in year *y* or hour *h* ($FC_{i,m,y}$) (ft^3 or l)

This parameter complies with the monitoring system and procedures described in the registered (ref 1a) and revised monitoring plan (ref. 1c) and applicable “Tool to calculate the emission factor for an electricity system” version 1.1 (ref. 5).

The tool indicates for the calculation of the Dispatch Data OM, that “if hourly fuel consumption data is available, then the hourly emissions factor is determined” following equation 10 of the tool (ref. 5). “Otherwise, the hourly emissions factor is calculated based on the energy efficiency of the power unit and the fuel type used” (equation 11 of the tool).

In the equation 11 the parameter $FE_{EL,n,y}$, CO_2 emission factor of power unit *n* in year *y*, needs to be determined and the tool provides 3 options B1, B2 and B3. The PP chooses option B1 because the information of the electricity generated by each power unit and also the monthly fuel consumption by each power plant is available.

The information is obtained by the PP from the monthly records published by published on the Statistical Yearbook of the Control Authority and Social control of Electricity (AE) (ref. 50) available at <http://www.ae.gob.bo/node/70> Ministry of Hydrocarbons and Energy of Bolivia and from AE (for data 2012) under request (ref. 51).

The monthly fuel consumption by each power plant is copied in the files “1.1) 11mar-11abr.xlsx” (ref 10a), “1.2) 11may-11oct.xlsx” (ref. 11a) and “1.3) 11nov-12abr.xlsx” (ref. 12a), “1.4) 12may-12jun.xlsx” (ref. 13a) sheet “Dat EF ELmy”, elaborated by the project participant and in this same sheet the parameter $EF_{EL,n,y}$ (CO_2 emission factor of power unit *n* in year *y*), is calculated. All the monthly data per plant/unit was reviewed and was some differences were found. **CAR 2 item 8 was raised.** The updated files were reviewed (10b to 13b), it was verified that all data is correct against Statistical Yearbook 2011 of the Control Authority and Social control of Electricity (AE) (ref 50) and the data (2012) received from directly from AE (ref 51). The correction did not have an impact over the final ER calculations since the differences were small and only in four units. **Item closed.**

3.10.3 Merit Order (dimensionless)

The Merit Order is a dimensionless parameter that indicates the order in which power plants are dispatched in the Bolivian grid. The Merit Order is obtained from the arranging of the average of the generation costs recorded every 15 minutes by the CNDC in the “Daily transactions report”, sheet “Costos_Generación_Térmica_15” (ref 38). This marginal cost is the result of a procedure applied by the CNDC by using short term stochastic dual dynamic programming optimization models approved by the power sector regulator (the Superintendence of Electricity) that takes into account the heat rate, the fuel cost and the Operation & Maintenance non-fuel costs of the Units.

The marginal cost is determined by the Operative Unit of the CNDC in accordance to the Operative Standard “Determinación de Costos Marginales, Remuneración y Asignación de Costos de Energía” (marginal cost determination, payments and energy cost appointments) approved through the administrative Resolution SSDE-014/2003 of the Superintendence of Electricity dated 07/02/2003 and subject to verification by the agents of the market and the regulator.

The information is available every 15 minutes and the hourly average by the CNDC in the “Daily Transaction Report” (ref. 38), sheets “Costos_Generación_Térmica_15” and “Costos de Generación Térmica”. The hourly average is copied in the files “1.1) 11mar-11abr.xlsx” (ref 10c), “1.2) 11may-11oct.xlsx” (ref. 11c) and “1.3) 11nov-12abr.xlsx” (ref. 12c), “1.4) 12may-12jun.xlsx” (ref. 13c), sheet “Coster”, elaborated by the project participant. After the information of the sheet “Coster” is organized hierarchically in the sheet “Hierarchy” and then the name of the plant/unit is related to the hierarchical number and it is entered in the sheet “HierUnit”. Finally in the sheet “HierMWh” is linked to the electricity generated by each power unit, also hierarchically. The information of the sheet “HierMWh” is used as input data to calculate the EF_{OM} considering the top of grid system dispatch order per hour.

The generators (agents) have direct access to the CNDC database through internet (<http://www.cndc.bo/home/>); non-agents do not have open access to full database. However the information is available by request to the CNDC. Therefore the assessment team sent a letter (through HB) to the CNDC requesting the parameter information (ref. 32) and the CNDC provided a letter (ref. 33) on 09/11/2012 containing a link to download the requested file; these files were downloaded by the assessment team directly from the CNDC’s web page. The days selected for the revision were the following:

Month	Days	Month	Days	Month	Days
Mar-2011	3, 4, 5, 6	Sep-2011	20, 21, 22, 30	Mar-2012	8, 18, 23, 31
Apr-2011	1, 15, 27, 29	Oct-2011	8, 11, 15, 21	Apr-2012	5, 6, 18, 20
May-2011	8, 12, 21, 23	Nov-2011	2, 13, 18, 30	May-2012	11, 24, 28, 31
Jun-2011	16, 17, 18, 19	Dec-2011	7, 9, 17, 26	Jun-2012	2, 25, 26, 28
Jul-2011	7, 13, 22, 23	Jan-2012	10, 14, 24, 28		
Aug-2011	5, 14, 17, 21	Feb-2012	4, 5, 20, 21,		

The generation cost was checked and verified for every thermal generation unit in the grid for the days listed in the table above and no mistake was found. Additionally all the steps followed to obtain the merit order were verified and found to be correct.

3.10.4 Electricity imports to the project electricity system $GEN_{n,m,y}$ IMPORTS

It was verified against the updated grid diagram of the net (ref 8) retrieved from CNDC web site that it is not connected to other grids, thus no imports/exports of energy are observed.

3.10.5 CO_2 emission factor of fossil fuel type i in year y ($EF_{CO2i,y}$)

This parameter complies with the monitoring system and procedures described in the registered PDD (ref 1a) and revised (ref 1d) monitoring plan and applicable “Tool to calculate the emission factor for an electricity system” version 1.1 (ref. 5).

The data used for $EF_{CO2i,y}$ (tCO₂/BTU) is equivalent from IPCC 2006 Guideline on National GHG Inventories (table 1.4 of Chapter 1 of Vol.2), the values included in the calculation files are based on the carbon

content. It was verified as well that the $EF_{CO_2i,y}$ obtained for each fuel is exactly the same value than the reported in IPCC 2006 (table 1.4 of Chapter 1 of Vol.2) and they correspond to the lower limit of the uncertainty at a 95% confidence interval, which is correct as per the mentioned tool because the parameter is used to calculate baseline emissions. The values used are: 72,600 kgCO₂/TJ and 54,300 kgCO₂/TJ, for gas/diesel oil and natural gas, respectively. Additionally it was verified that the units were correctly transformed from BTU to Joule.

The information source (IPCC) has been found to be correct because no national or regional values for this parameter are available in Bolivia.

3.10.6 Net calorific value (energy content) of fossil fuel type i in year y ($NCV_{i,y}$)

This parameter complies with the monitoring system and procedures described in the registered (ref 1a) and revised (ref 1c) monitoring plan and applicable tool (ref. 5). The data used for the NCV_i (BTU/ft³ or BTU/l) per generation unit is obtained from the monthly information published on CNDC's web page (<http://www.cndc.bo/estadisticas/anual.php>) for the natural gas plants and in the Node Price Report (ref. 39) for the Diesel Units., which is in line with the registered PDD (ref. 1).

The NCV data reported in files references 10, 11, 12 &13, tab "Dat EF ELmy" lines 132 to 150 was verified and found correct against the sources CNDC yearly reports (<http://www.cndc.bo/estadisticas/anual.php>) for the Natural Gas plant and in the in the Node Price Report (ref. 39) for the Diesel Units.

3.10.7 Average net energy conversion efficiency of power unit m in year y ($\eta_{m,y}$)

According to the registered monitoring plan (ref. 1a) and the applicable tool (ref. 5), this parameter only needs to be monitored and recorded once for the crediting period. Additionally the parameter is required for option B.2. to calculate the $EF_{EL;m;y}$, however the project uses option B1, thus the parameter is not required. Therefore the PP was requested to revise this issue in the PDD. **CAR 1 item 4 was previously raised and closed.**

The PP removed the parameter $\eta_{m,y}$ from the monitoring plan, as it was previously analyzed in section 3.2.4. this change does not require prior approval as per Annex 1 of PS version 2.1 paragraph 6a. The change introduced corresponds to the proper application of the Tool to calculate the emission factor for an electricity system" version 1.1. It was validated that the parameter is not applicable for the project, because the parameter $\eta_{m,y}$ is required for option B.2. to calculate the $EF_{EL;m;y}$, while the project uses option B1, thus the parameter is not required. Therefore, the revised PDD (ref 1d) follows correctly the application requirements of ACM0002 version 8 (ref 3) and the Tool to calculate the grid emission factor version 1.1 (ref 5).

3.10.8 Plant (unit) Name

This parameter complies with the monitoring system and procedures described in the registered (ref 1a) and revised (ref 1c) monitoring plan and it is required for the determination of the group of power units in the dispatch margin of the Operating Margin (OM). It was verified against the CNDC records (ref 37&38) that the PP uses the same name the official names. However nor the MR (ref 6a) neither the excel file (ref 10a to 13a) provides the whole name of the plants and its associated units. The PP was requested to complete the information. **CAR 2, item 6 was raised.** It was verified that MR version 2 (ref 6b) includes the power plants name and their corresponding units. **CAR 2, item 6 was closed**

3.10.9 Build Margin Emission factor (EF_{BM})

The EF_{BM} does not need to be calculate during each monitoring period, because as it is stated in the registered PDD (ref. 1a) and applicable tool (ref. 5), this parameter is calculated only once ex-ante at the start of the second crediting period.

3.10.10 Combined Emission factor $EG_{grid,CM,y}$

The $EG_{grid,CM,y}$ has been obtained for the monitoring period using the EF_{om} for the monitoring period and the EF_{BM} defined ex-ante. The weights used are $\omega_{OM} = 25\%$ and $\omega_{BM} = 75\%$, which are correct against the

applicable “Tool to calculate the emission factor for an electricity system” (ref 5). All calculations to obtain EFom where reviewed and found correct.

4. Calculation of Emission Reductions

Parameter	Reported Value (MR version 1 – ref 6a & calculation files – ref 10a, 11a, 12a, 13a, 14a)	Verified Value (MR version 4 – ref 6d & calculation files – ref 10c, 11c, 12c, 13c, 14d)
Electricity supplied by the project activity to the grid (EG_y), or according to PDD ($EG_{PJ,h}$)	452,317 MWh	452,317 MWh
CO ₂ emission factor of fossil fuel type i in year y ($EF_{CO2i,y}$) (ex-ante ref. 1a for EF_{cm})	Natural Gas: 5.72E-08 [tCO ₂ /BTU] Diesel Oil: 7.66E-08 [tCO ₂ /BTU]	Natural Gas: 5.72E-08 [tCO ₂ /BTU] Diesel Oil: 7.66E-08 [tCO ₂ /BTU]
Combined margin emission factor ($EF_{grid,CM}$)	0.63 tCO ₂ /MWh (average)	01/03/2011 – 30/06/2011: 0.63 01/07/2011 – 30/06/2012: 0.64 0.63 tCO ₂ /MWh (average)
Net electricity generated and delivered to the grid by power plant/unit m or n in year y or hour h ($EG_{m/n,y}$)	Due to the volume of information the data is not reported here, please see 10a, 11a, 12a & 13a	Due to the volume of information the data is not reported here, please see 10c, 11c, 12c & 13c
Amount of fossil fuel type i consumed by power plant/unit m or n in year y or hour h , ($FC_{i,m/n,y}$)		
Merit order in which power plants are dispatched		
Net calorific value (energy content) of fossil type i in year y , NCV_i		
Electricity imports to the Project electricity system, $EG_{n/m/y IMPORTS}$	0 MWh	0 MWh
Total Emission Reductions	286,329 tCO ₂	286,328 tCO ₂

The calculations are performed in accordance with the registered PDD (ref. 1), methodology ACM0002 and the “Tool to calculate the emission factor for an electricity system” v1.1 (ref. 5). CERs calculations are carried out according to the following formulas:

$$ER_y = BE_y - PE_y - L_y = 286,328 - 0 - 0 = 286,328 \text{ tCO}_2$$

Where:

$$PE_y = 0 \text{ and } L_y = 0 ;$$

BE_y are calculated as follows:

$$BE_y = EG_y \cdot EF_y$$

Where:

$$EF_y = EF_{grid,CM,y} = (w_{OM} \cdot EF_{grid,OM,y}) + (w_{BM} \cdot EF_{grid,BM,y})$$

According to the mentioned tool for the second crediting period the following applies: $w_{OM} = 0.25$ and $w_{BM} = 0.75$ and Build Margin emission factor is calculated *ex-ante*, based on the most recent information available.

This information has been already validated in the PDD (ref. 1a&1c) and the value applicable is $EF_{BM}=0.60$ tCO₂/MWh.

Operating margin emission factor ($EF_{grid, OM}$):

The dispatch data analysis OM emission factor is determined based on the power units that are actually dispatched at the margin during each hour h where the PA is displacing electricity and it is calculated as follows:

$$EF_{grid, OM-DD, y} = \frac{\sum_h EG_{PJ, h} * EF_{EL, DD, h}}{EG_{PJ, y}}$$

As the hourly fuel consumption data is not available (confirmed by CNDC ref. 33), the mentioned indicate that the hourly emission factor has to be calculated based on the energy efficiency of the power unit that are in the top of the dispatch and the fuel type used as follows:

$$EF_{EL, DD, h} = \frac{\sum_n EG_{n, h} * EF_{EL, n, y}}{\sum_n EG_{n, h}}$$

As it is also indicated in the tool, the CO₂ emission factor of the power unit n should be determined as per the guidance for the Simple OM using the options B1, B2 or B3. The PP chose option B1 according to the data and parameters available in the Bolivian electricity system.

Option B1 states: if for a power unit m data on fuel consumption and electricity generation is available, the emission factor ($EF_{EL, m, y}$ – same as $EF_{EL, m, y}$) is as follows:

$$EF_{EL, m, y} = \frac{\sum_i FC_{i, m, y} * NCV_{i, y} * EF_{CO2, i, y}}{EG_{m, y}}$$

After reviewing the calculation procedure followed in "1.1) 11mar-11abr.xlsx" (ref 10a), "1.2) 11may-11oct.xlsx" (ref. 11a) and "1.3) 11nov-12abr.xlsx" (ref. 12a), "1.4) 12may-12jun.xlsx" (ref. 13a), it was found that for the period March-June 2011 there was not available the comparison between 10% and "the quantity of electricity displaced by the project activity during hour h divided by the total electricity generation in the grid during that hour h " as required by the Tool (ref 5). **CL 4 was raised.**

As it was reported previously in section 3.2.4., a post registration change was introduced to the PDD because the registered PDD (ref 1a, page 28) described incorrectly the procedure to determine the units that are in the top of the dispatch. The revised monitoring plan (ref 1c) considers the correct procedure against the Tool (ref 5). Given this change the PP updated the calculation files, ref. 10b, 11b, 12b & 13b. It was verified that the PP included properly the comparison between 10% and the quantity of electricity displaced by the project per hour. The excel files corresponding to references 9b, 10b, 11b, 12b and 13b, tab "HierMWh x%", column CC contain the x%, which is the maximum between 10% and the quantity of electricity displaced by the project per hour. Later the x% is used to define the units in the top of the dispatch. The effect of this amendment did not have effect over the final value of the EFom because the amount of times that the project injections was higher than 10% was so small. **CL 4 was closed.**

It was found that the ER calculation file (ref 14c) did not round down the final ER calculation. Thus **CAR 2 item 13 was raised.** The PP provided the revised calculation files (ref 16d) and MR (ref 6d), and due to the correction the ERs are 286,328 tCO₂. **CAR 2 item 13 was closed.**

Thus it is confirmed that the last version of the calculations file are correct against ACM0002 version 8 (ref 3), the Tool (ref 3) and the revised monitoring plan (ref 1d). The spreadsheets were provided in an unprotected format; the calculations were verified and no mistake was found.

Emission Reduction:

Period	Reported Value (as per the web hosted MR) tCO ₂ e	Verified Value tCO ₂ e	If Different, Summary of Issues That Caused the Difference
01/03/2011 – 30/06/2012	286,329	286,328	CAR 2, where it was requested to round down of the values.
CERs (Up to 31 December 2012 (1st commitment period);)	286,329	286,328	CAR 2, where it was requested to round down of the values
CERs (From 1 January 2013 onwards.	no applicable	no applicable	no applicable

5. Recommendations for Changes in the Monitoring Plan

No recommendations to the Monitoring Plan were identified for following verification, however during this verification some amendments were introduced to the Monitoring Plan. Thus the revised PDD (ref 1d) contains the updated Monitoring Plan which is in compliance with ACM0002 version 8 (ref. 3) and the “Tool to calculate the emission factor for an electricity system” version 1.1 (ref 5).

6. Overview of Results

Is the project documentation in accordance with the requirements of the registered PDD and relevant provision of decision 17/CP.7, EB decisions and guidance and the COP/MOP?

Yes. The results of the compliance assessment are recorded in the verification checklist which is used as an internal report only.

Have on-site inspections been performed that may comprise, inter alia, a review of performance records, interviews with project participants and local stakeholders, collection of measurements, observations of established practices and testing of the accuracy of monitoring equipment?

Yes. Alicia Fernandez, Lead Assessor & local assessor, and David Watts, Sectoral scope technical expert visited the site and undertook interviews, collected data, audited the implementation of procedures, checked calibration certificates and checked data, inter alia.

The results of the site visit are recorded in the verification checklist which is used as an internal report only.

The evidences have been checked and collected. The final monitoring report is attached with this verification report.

Has data from additional sources been used? If yes, please detail the source and significance.

Yes, data from IPCC, CNDC and AE was used.

- Net electricity generated and delivered to the grid by power plant / unit m, j, k or n ($EG_{m,n,y}$), obtained from the CNDC; high significance and medium risk.*
- Amount of fossil fuel type i consumed by power plant / unit m or n in year y or hour h ($FC_{i,m,y}$), obtained from the CNDC and AE; high significance and medium risk.*
- Merit Order (dimensionless), obtained from the CNDC; high significance and medium risk.*
- CO_2 emission factor of fossil fuel type i in year y ($EF_{CO2i,y}$), obtained from IPCC; medium significance and low risk.*
- Net calorific value of fossil fuel type i in year y ($NCV_{i,y}$), obtained from CNDC; medium significance and medium risk.*
- Plant (unit) Name to calculate the Operating Margin, obtained from the CNDC; low significance and low risk.*
- Build Margin, fixed ex-ante based on information from CNDC& IPCC; medium significance and low risk*

Please review the monitoring results and verify that the monitoring methodologies for the estimation of reductions in anthropogenic emissions by sources have been applied correctly and their documentation is complete and transparent.

Yes. The monitoring methodology has been correctly applied and the monitoring report and supporting references are complete and transparent.

Have any recommendations for changes to the monitoring methodology for any future crediting period been issued to the project participant?

No.

Determine the reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the CDM project activity, based on the data and information using calculation procedures consistent with those contained in the registered project design document and the monitoring plan.

The data used in anthropogenic emission reduction calculation is consistent with those contained in the registered and revised PDD and monitoring plan. The emission reduction was 249,802 tCO₂ for the period 01/03/2011 to 30/06/2012 as per the estimation made in the registered and revised PDD. The actual emission reduction has been verified as 286,328 tCO₂ for the same period.

Identify and inform the project participants of any concerns related to the conformity of the actual project activity and its operation with the registered project design document. Project participants shall address the concerns and supply relevant additional information.

Yes, it was identified that by a requirement of the local authority now the project injects its energy to the grid through a different point (Chuspipata) in comparison with the one identified in the registered PDD (Kenko). The change was duly addressed in the revised PDD. The monitoring plan was updated accordingly in the revised PDD in order to incorporate the new electricity meter located in Chuspipata sub-station. The change introduced is to reflect the new situation and does not have any impact over the previous monitoring period and CERs already issues, because in previous periods the injection point was Kenko and the monitoring implemented at that time was the one defined in the registered PDD.

Post monitoring report on UNFCCC website

*Yes, the monitoring report is available at ref.1031 on the UNFCCC website
<http://cdm.unfccc.int/UserManagement/FileStorage/2QKJNT0B3P0HER4MVGFXL>
[C15ZSY9U8](#)*

7. Verification and Certification Statement

SGS United Kingdom Ltd has been contracted by Hidroeléctrica Boliviana S.A. to perform the verification of the emission reductions reported for the CDM project Rio Taquesi Hydroelectric Power Project, UNFCCC Reference Number 1031 in the period 01/03/2011 - 30/06/2012.

The verification is based on the validated and revised project design document and the monitoring report for this project. Verification is performed in accordance with section I of Decision 3/CMP.1, and relevant decisions of the CDM EB and CoP/MoP. The scope of this engagement covers the verification and certification of greenhouse gas emission reductions generated by the above project during the above mentioned period, as reported in the Monitoring Report version 4 dated 06/02/2013.

The management of Hidroeléctrica Boliviana S.A is responsible for the preparation, calculation and determination of GHG emission reductions from the project. The development and maintenance of records and reporting procedures are in accordance with the monitoring report.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 01/03/2011 - 30/06/2012 based on the reported emission reductions in the Monitoring Report Version 4 dated 06/02/2013 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, SGS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

SGS confirms that the project is implemented as described in the validated and revised project design documents. Based on the information we have seen and evaluated, we confirm the following:

Project Title:	Rio Taquesi Hydroelectric Power Project
UNFCCC Reference Number:	1031
Registered PDD and Approved Used for Verification:	Registered PDD version 2.05, dated 14/07/2009 Revised PDD version 5, dated 06/02/2013
Methodology Used for Verification:	ACM0002 version 8, dated 28/11/2008 Tool to calculate the emission factor for an electricity system, version 1.1, dated 29/07/2008
Applicable Period:	01/03/2011 - 30/06/2012
Total GHG Emission Reductions Verified:	286,328 tCO ₂

Signed on behalf of the Verification Body by Authorized Signatory

Signature:



Name: Siddharth Yadav

Date: 14/03/2013

8. Document References

Ref. 1a	Registered PDD, version 2.05, dated 14/07/2009															
Ref. 1b	Revised PDD version 3, dated 14/12/2012															
Ref. 1c	Revised PDD version 4, dated 07/01/2013															
Ref. 1d	Revised PDD version 5, dated 06/02/2013															
Ref. 2	Validation report, dated 27/01/2009															
Ref. 3	Consolidated baseline methodology for grid-connected electricity generation from renewable sources, ACM0002 version 8															
Ref. 3b	Consolidated baseline methodology for grid-connected electricity generation from renewable sources, ACM0002 version 13															
Ref. 4a	Validation and Verification Standard, version 2															
Ref. 4b	Validation and Verification Standard, version 03.0, dated 23/11/2012															
Ref. 5	Tool to calculate the emission factor for an electricity system, version 1.1															
Ref. 6a	Monitoring Report version 1, dated 24/10/2012															
Ref. 6b	Monitoring Report version 2, dated 14/12/2012															
Ref. 6c	Monitoring Report version 3, dated 07/01/2013															
Ref. 6d	Monitoring Report version 4, dated 06/02/2013															
	<table><tr><th>MR Version</th><th>Date of Revision</th><th>Main changes and reason for Revision (non-exhaustive), Section in MR where changes were made</th></tr><tr><td>1</td><td>24/10/2012</td><td>First version of the monitoring report initially uploaded for webhosting</td></tr><tr><td>2</td><td>14/12/2012</td><td>Update to include post-registration changes and mistakes in the reporting. The updated sections were B.2.3., D.2., E.1.and E.4..</td></tr><tr><td>3</td><td>07/01/2013</td><td>Updated of sections B.2.3., section D.2., section E.3</td></tr><tr><td>4</td><td>06/02/2013</td><td>Updated of sections B.2.3., B.2.4, section D.2., sections E.4., E.5. E.7.</td></tr></table>	MR Version	Date of Revision	Main changes and reason for Revision (non-exhaustive), Section in MR where changes were made	1	24/10/2012	First version of the monitoring report initially uploaded for webhosting	2	14/12/2012	Update to include post-registration changes and mistakes in the reporting. The updated sections were B.2.3., D.2., E.1.and E.4..	3	07/01/2013	Updated of sections B.2.3., section D.2., section E.3	4	06/02/2013	Updated of sections B.2.3., B.2.4, section D.2., sections E.4., E.5. E.7.
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3	07/01/2013	Updated of sections B.2.3., section D.2., section E.3														
4	06/02/2013	Updated of sections B.2.3., B.2.4, section D.2., sections E.4., E.5. E.7.														
Ref. 7	Clean Development Mechanism Project Standard version 02.1, dated 03/12/2012.															
Ref. 8	Line diagram of the Bolivian interconnected system, retrieved from http://www.cndc.bo/sin/sti.php															
Ref. 9	Verification report of UN 1031, CP2 MP2															
Ref. 9b	1.1) 10jul-10oct - Monthly spreadsheet containing the input data for the ERs calculations for the period July 2010 to October 2010. Version 1															
Ref. 10a	1.1) 11mar-11abr - Monthly spreadsheet containing the input data for the ERs calculations for the period March 2011 to April 2011. Version 1															
Ref. 10b	1.2) 10nov-11abr - Monthly spreadsheet containing the input data for the ERs calculations for the period November 2010 - April 2011. Version 2															
Ref. 10c	1.2) 10nov-11abr - Monthly spreadsheet containing the input data for the ERs calculations for the period November 2010 - April 2011. Version 3															
Ref. 11a	1.2) 11may-11oct - Monthly spreadsheet containing the input data for the ERs calculations for the period May 2011 to October 2011. Version 1															
Ref. 11b	1.3) 11may-11oct - Monthly spreadsheet containing the input data for the ERs calculations for the period May 2011 to October 2011. Version 2															
Ref. 11c	1.3) 11may-11oct - Monthly spreadsheet containing the input data for the ERs calculations for the period May 2011 to October 2011. Version 3															
Ref. 12a	1.3) 11nov-12abr - Monthly spreadsheet containing the input data for the ERs calculations for the period November 2011 to April 2012. Version 1															
Ref. 12b	1.3) 11nov-12abr - Monthly spreadsheet containing the input data for the ERs calculations for the period November 2011 to April 2012. Version 2															
Ref. 12c	1.3) 11nov-12abr - Monthly spreadsheet containing the input data for the ERs calculations for the period November 2011 to April 2012. Version 3															
Ref. 13a	1.4) 12may-12jun - Monthly spreadsheet containing the input data for the ERs calculations for the period May 2012 to June 2012. Version 1															
Ref. 13b	1.4) 12may-12jun - Monthly spreadsheet containing the input data for the ERs calculations for the period May 2012 to June 2012. Version 2															
Ref. 13c	1.4) 12may-12jun - Monthly spreadsheet containing the input data for the ERs calculations for the period May 2012 to June 2012. Version 3															
Ref. 14a	2) Annex3 v1.0 - ERs calculations spreadsheet and grid emission factor. Version 1, dated 01/08/2012															
Ref. 14b	2) Annex3 v2.0 - ERs calculations spreadsheet and grid emission factor. Version 2, dated 14/12/2012															
Ref. 14c	2) Annex3 v3.0 - ERs calculations spreadsheet and grid emission factor. Version 3, dated 07/01/2013															
Ref. 14d	2) Annex3 v4.0.xlsx 0 - ERs calculations spreadsheet and grid emission factor. Version 4, dated															

	06/02/2013
Ref. 15a	a) SMEC 11mar-12jun - Spreadsheet of the hourly energy injected to the grid per unit. Version 1
Ref. 15b	a) SMEC 11mar-12jun - Spreadsheet of the hourly energy injected to the grid per unit. Version 2
Ref. 15c	a) SMEC 11mar-12jun - Spreadsheet of the hourly energy injected to the grid per unit. Version 3
Ref. 16a	b) HB GGEN 11mar-12jun.xlsx - Spreadsheet containing the calculation of the Gross Generation of the project activity. Version 1
Ref. 16b	b) HB GGEN 11mar-12jun.xlsx - Spreadsheet containing the calculation of the Gross Generation of the project activity. Version 2
Ref. 16c	b) HB GGEN 11mar-12jun.xlsx - Spreadsheet containing the calculation of the Gross Generation of the project activity. Version 3
Ref. 16d	b) HB GGEN 11mar-12jun.xlsx - Spreadsheet containing the calculation of the Gross Generation of the project activity. Version 4
Ref. 17	a.CHJ_BORN - Calibration certificate meter s/n 2008232369
Ref. 18	b.YAN_BORN - Calibration certificate meter s/n 2008232367
Ref. 19	c1.CJL01_BORN - Calibration certificate meter s/n 2006338412
Ref. 20	c2.CJL01_BORN - Calibration certificate meter s/n 2008232368
Ref. 21	d1.CJL02_BORN - Calibration certificate meter s/n 2006338410
Ref. 22	d2.CJL02_BORN - Calibration certificate meter s/n 2006338411
Ref. 23	e.CHJ_PCH - Calibration certificate meter s/n 012300419
Ref. 24	f.YAN_PCH - Calibration certificate meter s/n 012300420
Ref. 25	g.CJL_PCH - Calibration certificate meter s/n 0123201485
Ref. 26	h.SEY_PCH - Calibration certificate meter s/n 020401046
Ref. 27	i.HBO_CHS - Calibration certificate meter s/n 53120604
Ref. 28	Med SEL734 G1 OLDCHJ- Calibration certificate meter s/n 2006338412
Ref. 29	Med SEL734 G2 OLDCHJ- Calibration certificate meter s/n 2006338410
Ref. 30	SEL-CalibCycleMssg - Calibration frequency recommended by the manufacturer of SEL meters
Ref. 31	ANX3B-JEMSTAR - Calibration frequency recommended by the manufacturer of JEMSTAR meters
Ref. 32	Letter submitted by SGS to CNDC requesting information
Ref. 33	Letter received from CNDC giving access to SGS to the information requested
Ref. 34	LACEEL_SMEC 220607 - LACEEL report dated 22.06.2007. Revision and verification of the measuring commercial system (SMEC)
Ref. 35	Informe final Verificación SMEC – CNDC- V5.2 - LACEEL report dated 28.02.2011. Revision and verification of the measuring commercial system (SMEC)
Ref. 36	Informe Postdespacho - Postdispatch reports, period March 2011 - June 2012
Ref. 37	SMEC Reports - Files received from CNDC. SMEC monthly reports, period March 2011 - June 2012
Ref. 38	Daily Transaction Report - Files received from CNDC. Daily transaction reports, samples requested for period March 2011 - June 2012
Ref. 39	Node Price Report - Files received from CNDC. Node Price report period March 2011 - June 2012
Ref. 40	memyres_2011 - Yearly stastic book 2001, summary of SIN operation, issued by CNDC
Ref. 41	pcalorifico_2012 - 2012 Calorific value records, CNDC
Ref. 42	pcalorifico_2011 - 2011 Calorific value records, CNDC
Ref. 43	Monitoring report and Verification report of UNFCCC 1031, second monitoring period of the second crediting period
Ref. 44	Attendance list opening &closing meeting - Dated 28&29/11/2012, signed by the PP and assessment audit team
Ref. 45	PartesDiarios - daily operation records of Yanacahi and Chojilla units
Ref. 46	d3.CJL02_BORN - Calibration certificate s/n 2006338411
Ref. 47	c3.CJL01_BORN - Calibration certificate s/n 2008232368
Ref. 48	Pictures - Photos of the onsite meters taken during the site visit carried out on 28&29/11/2012
Ref. 49	Medicion - Raw data obtained from meters related to Chojalla& Yanacahi
Ref. 50	IMG-ANUARIO-admin-2012-06-20-anuario_2011 - Statisticayearbook 2011, issued by AE
Ref. 51	AE_2271_DDO_398_12 - Letter from AE providing fuel consumption from January to June 2012
Ref. 52	Transacciones Economicas - Monthly reports of economic transactions (DTE)
Ref. 53	consgas_2012 - Records 2012 of gas consumption, CNDC
Ref. 54	consgas_2011 - Records 2011 of gas consumption, CNDC
Ref. 55	Bolivia Geography and climate - Antecedents of Climate & geography in Bolivia
Ref. 56	083 carta HB SL7k - Calibration frequency recommended by the manufacturer of ITRON meters
Ref. 57	PeriodCalibITRON - Calibration frequency recommended by the manufacturer of ITRON meters
Ref. 58	CambioMedOperac - Historical mails supporting change of meters

Ref. 59	ReporteCambioMedidores - Mail reporting change of meters within HB
Ref. 60	.1103_ParteDiario O&M - Monthly record (march 2011) containing daily records of plants operation
Ref. 61	1107_ParteDiario O&M - Monthly record (march 2011) containing daily records of plants operation
Ref. 62	CJL1cjl002_110301_18 - Generation Raw data march 2011, Chojlla Antigua 1
Ref. 63	CJL1cjl002_110318_31 - Generation Raw data March 2011 (detailed), Chojlla Antigua 1
Ref. 64	CJL1cjl002_1107 - Generation Raw data July 2011, Chojlla Antigua 1
Ref. 65	CJL1cjl002_1107desde el 8 de julio - Generation Raw data July 2011 (detailed), Chojlla Antigua 1
Ref. 66	CJL2cjl002_110301_18 - Generation Raw data march 2011, Chojlla Antigua 2
Ref. 67	CJL2cjl002_110318-31 - Generation Raw data March 2011 (detailed), Chojlla Antigua 2
Ref. 68	CJL2cjl002_1107 - Generation Raw data July 2011, Chojlla Antigua 2
Ref. 69	dc_080711 - Dispatch report 08/07/2011
Ref. 70	CJL2cjl002_1107desde el 8 de julio - Generation Raw data July 2011 (detailed), Chojlla Antigua 2
Ref. 71	Certificat - Calibration certificate s/n 2008232368
Ref. 72	Revisions data (Internal working file) - File created by SGS to corroborate data
Ref. 73	Anuario AE 2010 - Statisticayearbook 2011, issued by AE
Ref. 74	DieselConForm - HB's records of diesel consumption
Ref. 75	EmergencyGen - Calculation of project emissions due to diesel consumption.
Ref. 76	Ley 1604 - Law 1604
Ref. 77	rsmec_0308 - Commercial measurement system of the wholesale electric market in Bolivia, 2008
Ref. 78	DS_0488_10 - Supreme Decree N°488
Ref. 79	inf023_10 - CNDC Report N°23/10
Ref. 80	HB.RMI.0298.12 - Letter from HB to CNDC reporting status of meter located in Chuspipata
Ref. 81	Partial read of load profile-01-2012-05-02-09-33-38 - Records of measurements in Chuspipata on 01/05/2012
Ref. 82	Ref24.0629.12 - Act of reception of measurement system in Chuspipata, signed by HB and CNDC
Ref. 83	tran0612 - Report of economic transactions June 2012, CNDC
Ref. 84	rsmec_2012 - Commercial measurement system of the wholesale electric market in Bolivia, 2012
Ref. 85	Informe de Precios de Nodo 30042010 - Node price report, period May - October 2010
Ref. 86	Informe de Precios de Nodo 12042012 - Node price report, period May - October 2012
Ref. 87a	EFcm calculation file vintage nov/07-oct/08 used at the validation of the renewal of the crediting period.
Ref. 87b	Revised EFcm calculation file vintage nov/07-oct/08.
Ref. 87c	Revised EFcm calculation file vintage CP2 MP1, Jul/09-Feb/11
Ref. 88	genbruta_2011 - Gross generation records 2011 per power plant, CNDC
Ref. 89	Proceso P-OM-02_v3 - HB internal procedure for monitoring
Ref. 90	AE_218_2010_Norm Op8 - Operative Norm N°8, issued 28/05/2010
Ref. 91a.	PDD CP1 - Registered PDD of project UNFCCC 1031 valid for the first crediting period, version 3, dated 15/09/2006
Ref. 91b.	RMP CP1 - Revised monitoring plan approved during the first crediting period.
Ref. 91c	Verification Report MP1 – Verification report corresponding to the CP 1 MP1
Ref. 91d.	Verification Report MP2 – Verification report corresponding to the CP 1 MP2
Ref. 91e	Request for review MP2 – Request for review received during CP1 MP2
Ref. 91f	Verification Report MP3 – Verification report corresponding to the CP 1 MP3
Ref. 92	HB_Estim CERs - Project electricity generation based on SSDP
Ref. 93	Certificado NOSA 02061 – 2011 - NOSA Integrated Five Star System certificate from HB
Ref. 94	tran0410 – Report of economic transactions, CNDC, April 2010.
Ref. 95	tran0510 - Report of economic transactions, CNDC, May 2010.

9. Findings Overview

Findings Overview

Findings Overview Summary

	CARs	CLs	FARs
Total Number raised	3	3	-

Date:	22/11/2012	Raised by:	Alicia Fernández		
Type:	CAR	Number:	1	Reference:	AU4, section 5.1
Lead Assessor Comment:				Date: 22/11/2012	
<u>Monitoring Plan Committed & Implemented</u>					
1. The monitoring frequency defined for parameter EGm/n,y in the Monitoring Plan is not in compliance with Tool to calculate the grid emission factor version 1.1.					
2. As per MR version 1 the parameter EGm/n,y appears as “calculated”, while as per the registered MP is “measured”.					
CAR 1 was raised.					
Project Participant Response:				Date: 14/12/2012	
1. It has been confirmed that the monitoring frequency defined for parameter EGm/n/y in the Monitoring Plan of the PDD was not in compliance with ACM0002 version 8, Tool to calculate the emission factor for an electricity system, version 01.1. Nevertheless, the monitoring frequency and the measurement method were implemented as established in the ACM0002 version 8, being the data measured hourly and recorded monthly. Updated versions of the PDD and the Monitoring Report show the changes mentioned.					
2. The updated MR, version 2, shows a correction with regards to the parameter EGm/n/y, where it now says “Measured”					
Documentation Provided as Evidence by Project Participant:					
1. Reference 1: Updated version of the PDD, Ref1.HB_PDD_v4 (WORD file), section B.7.1. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section D.2.					
2. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section D.2.					
Information Verified by Lead Assessor:					
HB_PDD_v4 .docx - ref 1b - PDD version 3, Document review.					
Mar11-Jun12HB1031_MR_v2.docx – ref 6b, MR version 2 dated 14/12/2012, Document review					
Reasoning for not Acceptance or Acceptance and Close Out:					

1. Given the inconsistency found in the monitoring frequency, the PP updated the Monitoring Plan (PDD section B.7.1, ref 1b). It was validated that the parameter was duly corrected and it is now in compliance with ACM0002 version 8 and the Tool to calculate the grid emission factor version 1.1.

According with the data reviewed (refs. 10a, 11a, 12a, 13a & 15a), it was verified that the data of the parameter EGm/n,y is measured with the frequency defined in the corrected MP/PDD. Thus the permanent change included in updated PDD (ref 1a), page 35, it is only a correction because always the data has been available as per the Tool (ref 5) requirements. It is important to highlight that EGm/n,y is obtained from the CNDC (grid operator), thus it is not monitored directly by the PP.

The change in the monitoring frequency of EGm/n,y does not require prior approval because:

- As per PS (EB 70 annex 2) it classifies as paragraph 5a "*Change of calibration frequency or practice for monitoring equipment not within the control of project participants*". As it was mentioned before, the parameter EGm/n,y is obtained from the grid operator (CNDC) who monitored the generation of every power plant of the system. On the other hand, the change it is only a correction on the PDD because in the practice the monitoring frequency is in compliance with the Tool (ref 5) requirement.
- It does not threaten PS (EB 70 annex 2), section 4, paragraph 6a-c.

Proposed or actual changes to the project design of a registered CDM project activity that do not adversely impact any of the following do not require prior approval by the Board:

- a. *The applicability and application of the applied methodology under which the project activity has been registered;*

The project follows ACM0002 version 8 and Tool to calculate the grid emission factor version 1.1, both duly approved by the EB. The change introduced does not involve a change in the applicable methodology or the Tool.

- b. *The additionality of the project activity;*

The change does not have any impact in the additionality because is a correction in the MP.

- c. *The scale of the project activity.*

The project classifies as a "large scale project", the change introduced does not have any impact in the project scale.

The correction to the monitoring frequency of EGm/n,y introduced to the MP/PDD was not reported in the MR, section B.2.3. Please complete. **Item remains open.**

2. It was validated that the MR was updated accordingly with the MP. The parameter is obtained from the grid operator (CNDC) who monitors the energy generation of each power plant of the system and keeps the information online on <http://www.cndc.bo/home/index.php> for all the generators. **Item closed.**
3. It was found that the Monitoring Plan (ref 1a) contained in the registered PDD (ref 1a) does not contain the parameter EF_{grid, CM} as required by ACM0002 version 8 on page 16. Please correct. **Item open.**

CAR 1 remains open.

Acceptance and Close out by Lead Assessor:	Date: 02/01/2013, updated 09/01/2013
Project Participant Response:	Date: 07/01/2013 – 11/01/2013
1. The amendment of the monitoring frequency for parameter EGm/n,y introduced in the MP/PDD is reported in the updated version of the MR, section B.2.3.	
3. The parameter EF _{grid, CM} , as required by ACM0002 version 8, has been included and applied in the revised PDD, section B.7.1 and in the updated MR, section D.	
Documentation Provided as Evidence by Project Participant:	
1. Reference 2: Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v3"), section B.2.3.	
3. Reference 1: Updated version of the PDD (MS-WORD file: "Ref1.HB_PDD_v4 "), section B.7.1. Reference 2: Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v3"), section D.	

Information Verified by Lead Assessor:	
- Mar11-Jun12_HB1031_MR_v3 – Ref 6c, Monitoring report version 3, dated 07/01/2013 - HB_PDD_v4 – Ref 1c, PDD version 4, dated 06/02/2013	
Reasoning for not Acceptance or Acceptance and Close Out:	
1. It was verified that MR version 3 (ref 6c) reports correctly the monitoring frequency as per the revised PDD and as per system implemented by the CNDC. Item closed. 3. It was verified that the parameter EF_{cm} was duly included in the revised PDD (ref 1c) and the MR (ref 6c). This parameter corresponded to an omission in the list of parameters in the PDD and MR, however it was calculated previously. It was verified that in PDD the EF_{cm} was obtained as per the calculation steps defined in the Tool (ref 5): As it is detailed in CL 4, the steps to obtain the EF_{cm} was corrected because it did not considered correctly the % to define the set of plants/units that are in the top of the dispatch. The PP provided the calculation files used at the re-validation time but correcting the determination of the units that are in the top of the dispatch. It was verified that the calculation is correct, and the correct application of the Tool lead to have some difference in the intermediate values (eg. Emissions of the % of the top), however the final value of EF_{cm} did not change. Please see the detailed assessment of the calculation procedure in CL 4 Item closed. CAR 1 was closed. Re-opened on 04/02/2013. 3. Please reconsider the inclusion of the parameter EF_{grid,CM,Y} in the MR as a change to the PDD, as per Project Standard, Annex 1, paragraph 6. Item remains open. 4. Please revise if “$\eta_{m,y}$” is required as part of the Monitoring plan and the requirements of the “Tool to calculate the emission factor for an electricity system”. In case that the parameter is deleted/removed from the MP, please include this change in to the PDD in the MR accordingly. Item open. CAR 1 remains open	
Acceptance and Close out by Lead Assessor:	Date: 14/01/2013, 04/02/2013
Project Participant Response:	Date: 06/02/2013
3. The description of the inclusion of the parameter “EF_{grid,CM,Y}”, is mentioned in the updated version of the MR, section B.2.4. 4. Since the parameter “$\eta_{m,y}$” was not applicable for the Project, it was removed from the PDD and the MR. This change is mentioned in the updated version of the MR, section B.2.4.	
Documentation Provided as Evidence by Project Participant:	
3. Updated version of the MR (MS-WORD file: “Ref2.Mar11-Jun12_HB1031_MR_v4”), section B.2.4. 4. Updated version of the MR (MS-WORD file: “Ref2.Mar11-Jun12_HB1031_MR_v4”), section B.2.4. Updated version of the PDD (MS-WORD file: “Ref1.HB_PDD_v5 ”), section B.7.1	
Information Verified by Lead Assessor:	
- HB_PDD_v5.doc (ref 1d), PDD version 5 dated 06/02/2013 - Mar11-Jun12_HB1031_MR_v4.doc (ref 6d), MR version 4 dated 06/02/2013	
Reasoning for not Acceptance or Acceptance and Close Out:	
3. It was verified that the inclusion of the parameter EF_{grid,CM,Y} in the MR version 4 (ref 6d) has been classified as a change to the PDD. It is deemed correct, because even the change is directly related with the monitoring this post registration change does not comply with PS, annex 1, section 3, therefore it has to be presented as a change to the PDD complying with PS, annex 1, section 4. Item closed. 4. It was verified that in PDD version 5 (ref 1d) was removed the parameter “$\eta_{m,y}$” because it is not required by the project because it uses option B.1. to calculate the EF_{EL,m,y}, and the removed parameter is used in option 2.. It was verified that the introduced change is in compliance with PS, annex 1, section 4. Item closed. CAR 1 was closed.	
Acceptance and Close out by Lead Assessor:	Date: 07/02/2013

Date:	22/11/2012		Raised by:	Alicia Fernández	
Type:	CAR	Number:	2	Reference:	AU4, section 5.1
Lead Assessor Comment:				Date: 22/11/2012	
Monitoring Report					
- As per UNFCCC Guideline to complete the MR (EB66 annex 20), please reports dates using the form "DD/MM/YYYY" - Section A.5 of the MR does not contain the type of crediting period (Fixed / Renewable). Please complete. - As per MR version 1 the parameter EGm/n/,y refers to "table E.1" (for monitored values) and "table 1, annex 1" (for monitoring equipment): Please note that the first table does not contain the parameter information. Regarding the second issue the MR does not have any annex. Please clarify. - Please report the validity of the calibration of each meter involved in the monitoring. - For each parameter whose data is not included in the MR, please report in the MR the file that contain the information. - Nor the MR (ref 6a) neither the excel file (ref 10a to 13a) provides the whole name of the plants and its associated units. PP was requested to complete the information. - It was found that the ex-ante values reported in the MR, section E5, are not consistent with the values available in the registered PDD. Please clarify and correct is applicable. - Please revise and correct the monthly fuel consumption of the power plants, some of them does not match with the data reported in the Statistical Yearbook of the Control Authority and Social control of Electricity (AE) (ref 50) and the data (20129 received from directly from AE (ref 51)					
CAR 2 was raised.					
Project Participant Response:				Date: 14/12/2012	
- The MR is updated, it reports dates using the form "DD/MM/YYYY" - The type of the crediting period (renewable) is completed in the MR, section A.5. - A mistake was found in the labelling of the tables. To better understanding, the files containing the data are indicated in the updated MR, version 2, section D.2. - The validity of the calibration of the meters (which are supervised by PP) is reported in the new MR version 2, section D.2. - The current MR version 2, shows references to EXCEL files and spreadsheets containing the information not included in the body of the MR (section D.2.) - A table including the name of the plants is included in the new MR version 2, Table E2. - Not like what the DOE has done (i.e. getting "mean" monthly generation values), emission reductions estimated in the PDD and the MR for comparison purposes are consistent with monthly energy injected values, and take into account the seasonal behaviour of every month in the dry, rainy and transitional seasons. These values are based on the results of the software SDDP (Stochastic Dynamic Dual Programming, a hydrothermal dispatch model used by the CNDC and the Bolivian power sector agents for forecasting / programming the load dispatch) and is affected by the losses and other factors as shown in the next table:					

<i>Month</i>	<i>Estimated Energy injected to the grid GWh</i>
<i>Jul-2011</i>	<i>8.60</i>
<i>Aug-2011</i>	<i>9.50</i>
<i>Sep-2011</i>	<i>10.09</i>
<i>Oct-2011</i>	<i>18.52</i>
<i>Nov-2011</i>	<i>27.09</i>
<i>Dec-2011</i>	<i>40.35</i>
<i>Jan-2012</i>	<i>49.77</i>
<i>Feb-2012</i>	<i>46.25</i>
<i>Mar-2012</i>	<i>45.39</i>
<i>Apr-2012</i>	<i>29.07</i>
<i>May-2012</i>	<i>15.97</i>
<i>Jun-2012</i>	<i>9.24</i>
<i>Total</i>	<i>309.84</i>

<i>Months</i>	<i>[GWh]</i>	<i>[tCO2/MWh]</i>	<i>[tCO2]</i>
<i>Jul11-Jun12</i>	<i>309.84</i>	<i>0.61</i>	<i>189,001</i>

8. The monthly fuel consumption of the power plants was verified and corrected according to the data reported in the Statistical Yearbook of the Control Authority and Social control of Electricity (AE). The MS-EXCEL files of the Baseline contain the corrections made.

Documentation Provided as Evidence by Project Participant:

1. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section D.2.
2. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section A.5.
3. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section D.2.
4. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section D.2.
5. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section D.2 and Table E.2 (Names of the plants and its associated units) Also EXCEL Baseline files: "1.1) 10jul-10oct", "1.2) 10nov-11abr", "1.3) 11may-11oct", "1.4) 11nov-13abr" and "1.5) 12may-12jun"; spreadsheets: "Hier & HierUnit", "Dat EF ELmy" for MERIT ORDER and NCV respectively.
6. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), Table E.2.
7. Reference 3: Monthly Production Estimations, Ref3.HB_Estim CERs (EXCEL file), spreadsheet: "Aplic2"
8. EXCEL Baseline files: "1.1) 10jul-10oct", "1.2) 10nov-11abr", "1.3) 11may-11oct", "1.4) 11nov-13abr" and "1.5) 12may-12jun"; spreadsheet: "Dat EF ELmy".

Information Verified by Lead Assessor:

Mar11-Jun12HB1031_MR_v2.docx - ref 6b. Monitoring Report version 2, document review.
HB_Estim CERs.xlsx – Ref 92

Reasoning for not Acceptance or Acceptance and Close Out:

1. It was verified that MR version 2 (ref 6b) reports dates using the form dd/mm/yyyy. **Item closed.**
2. It was verified that MR section A.5 (ref 6b) was completed. It states that the crediting period is renewable and reports as well the dates of the current crediting period. **Item closed.**
3. It was verified that MR version 2 (ref 6b) corrected the reference where the data of EGm/n/y is available ("a) SMEC 11mar-12jun", spreadsheet: "smec mar11-jun12), it is correct and corresponds to ref 15a. Since the volume of information (hourly values per each power plant / unit), the criteria of providing the reference instead reporting the data in the MR is deemed suitable. **Item closed.**

4. It was verified that MR version 2 (ref 6b) includes the validity of the calibration of each, however it is longer (1 day) than the value recommended by the manufacturer. Please revise and correct. Item remains open.	
5. It was verified that for parameters: $EG_{m/n/y}$, $FC_{i, m/n, y}$, MERIT ORDER, $NCV_{i, and}$ Plant (unit) name, the MR version 2 (ref 6b) identifies clearly where the data is available. It was verified that for the cited parameters the amount of information is too large to be included in the table of section D.2. Please include the name of the file where is reported the detailed data of $EG_{PJ, h}$. Item remains open.	
6. It was verified that MR version 2 (ref 6b) includes the power plants name and their corresponding units. Item closed.	
7. The PP clarified that the ex-ante estimation was done considering the expected generation per month; it means taking into account the seasonal effect. The information reported by the PP in the answer is consistent with the rainy season (summer) in Bolivia (ref 55). Thus it was verified that the expected annual generation (from July to June) is 309 GWh/year, which is the same value reported in the registered PDD (ref 1a). Therefore considering the approach followed by the PP, the expected generation for period March/2011 – June 2012 was 409.51 GWh. It was verified that MR version 2 (ref 6b), table 6.1., reports the expected energy generation and the value achieved separated in two parts from March 2011 to June 2011, and one year period from July 2011 to June 2012. Item closed.	
8. The updated files were reviewed (9b to 13b), it was verified that all data is correct against Statistical Yearbook 2011 of the Control Authority and Social control of Electricity (AE) (ref 50) and the data (2012) received from directly from AE (ref 51). Since additional data was included to consider one full year to calculate the EFom, the fossil consumption for the period July 2010 – February 2011 was reviewed against the corresponding Statistical Yearbook (2011&2012) (ref 73& 51 respectively). Item closed.	
9. Please update the MR according to the last template available at UNFCCC web site. Item open.	
CAR 2 remains open.	
Acceptance and Close out by Lead Assessor:	Date: 02/01/2013
Project Participant Response:	Date: 07/01/2013
4. The validity of the calibration for each meter is longer (1 day) than the value recommended by the manufacturer. The data was corrected.	
5. The updated version of the MR references the file where the detailed data of the parameter $EG_{PJ, h}$ is reported.	
9. The MR was updated according to the last template available at UNFCCC.	
Documentation Provided as Evidence by Project Participant:	
4. Reference 2: Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v3"), section D.2.	
5. Reference 2: Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v3"), section D.2.	
9. Reference 2: Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v3").	
Information Verified by Lead Assessor:	
Mar11-Jun12_HB1031_MR_v3 – Ref 6c, Monitoring report version 3 dated 07/01/2013	
Reasoning for not Acceptance or Acceptance and Close Out:	
4. It was verified that the PP corrected the validity of the calibration period in accordance with the manufacturer recommendation. Item closed.	
5. It was verified that the PP provided in the MR, parameter EG_{pj} , the information where is available the full set of data involved by the parameter. Item closed.	
9. It was verified that the PP updated the MR to the last version available. It was verified as well that the template is correct and no parts were modified. Item closed.	
CAR 2 was closed (14/01/2013), re-opened on 31/01/2013.	

10. Please correct in the MR the Project Participant information for Netherlands as per project info at UNFCCC website. Item open. 11. Please complete MR section B.2.3 & B.2.4. ,as per the guideline for completing MR form, including the version number and completion date of the revised PDD. Item open 12. a. Please revise and correct in MR, Section D.2, parameter $EG_{PJ,h}$, the reference given for the data. b. Please revise and correct in MR, Section D.2, parameter Merit Order and NCVi the reference given for the data, the file indicated is incorrect. c. Please revise and correct in MR, Section D.2, parameter $EF_{grid,CM,y}$, please revise and correct the dates indicated for each period. d. In file: "2) Annex3 v3.0.xlsx", tab "Init", cell D/, please correct the misspelling "2st" e. In file "b) HB GGEN 11mar-12jun.xlsx", tab "mar11-jun12 GGen", please revise and correct the information of cell A1, it states 'HB Terminal Meter [kWh]: Jul 01, 2009 to Jun 30, 2010', Item open 13. Please note that in file "2) Annex3 v3.0.xlsx", tab "Annex3 Values", cell J 86, J87 and J90 the values were not rounded down. Please correct the calculation file and MR. Item open 14. In file "2) Annex3 v3.0.xlsx", tab "Annex3 Values", cell C86, C87 is reported "Life time" (0.17 and 1 year). Please clarify if this info is needed. Item open 15. Please provide the source used for the unit conversion BTU – TJ, as per conversion units available on line the conversion is $1 \text{ Btu} = 1.05505585 \times 10^{-9} \text{ TJ}$ Item open CAR 2 remains open.	
Acceptance and Close out by Lead Assessor:	Date: 14/01/2013 , 31/01/2013
Project Participant Response:	Date: 06/02/2013
10. The information was corrected in the MR, section A.3. 11. The version number and the completion date of the revised PDD was included in the MR, section B.2.3 and B.2.4. 12. a. The information was corrected in the MR, section D.2. b. The information was corrected in the MR, section D.2. c. The information was corrected in the MR, section D.2. d. The information was corrected in the file "2) Annex3 v4.0.xlsx", tab "Init". e. The information was corrected in the file "b) HB GGEN 11mar-12jun.xlsx", tab "mar11-jun12 GGen". 13. The cells J86, J87 and J90 of the file "2) Annex3 v4.0.xlsx", tab "Annex3 Values", were rounded down. There were no modifications in the final values. 14. The cells C86, C87, F86 and F87 of the file "2) Annex3 v4.0.xlsx", tab "Annex3 Values", were removed. These data do not affect the final values. 15. The source used for the unit conversion BTU – TJ, is the web page: http://en.wikipedia.org/wiki/British_thermal_unit. $1 \text{ Btu} = 1.05480 \times 10^{-9} \text{ TJ}$.	
Documentation Provided as Evidence by Project Participant:	
10. Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section A.3. 11. Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section B.2.4 and B.2.4. 12. a. Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section D.2. b. Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section D.2. c. Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section D.2. d. MS-EXCEL file: "2) Annex3 v4.0.xlsx", tab "Init". e. MS-EXCEL file: "b) HB GGEN 11mar-12jun.xlsx", tab "mar11-jun12 GGen". 13. MS-EXCEL file: "2) Annex3 v4.0.xlsx", tab "Annex3 Values". 14. MS-EXCEL file: "2) Annex3 v4.0.xlsx", tab "Annex3 Values". 15. Web page: http://en.wikipedia.org/wiki/British_thermal_unit. $1 \text{ Btu} = 1.05480 \times 10^{-9} \text{ TJ}$.	
Information Verified by Lead Assessor:	

- Mar11-Jun12_HB1031_MR_v4 (ref 6d), MR version 4 dated 06/02/2013
- 2) Annex3 v4.0.xlsx (ref 14d), ER calculation file version 4, dated 06/02/2013
- b) HB GGEN 11mar-12jun.xlsx (16d), Spreadsheet containing the calculation of the Gross Generation of the project activity. Version 4
- HB_PDD_v5.doc (ref 1d), PDD version 5 dated 06/02/2013

Reasoning for not Acceptance or Acceptance and Close Out:

10. It was verified that MR version 4 has the correct information about the PP. **Item closed.**
11. It was verified that MR version 4 duly includes the version and date of the revised PDD which includes all the post registration changes that are been presented. **Item closed.**
12. a. It was verified that MR version 4 (ref 6d) indicates correctly the relevant files containing the data of the parameter. **Item closed.**
- 9.1 b. It was verified that MR version 4 (ref 6d) indicates correctly the relevant files containing the data of the parameters. **Item closed.**
- c. It was verified that MR version 4 (ref 6d) provides the correct period of time for EFgridcm. **Item closed.**
- d. It was verified that the typo was corrected. **Item closed.**
- e. it was verified that the editorial mistake has been corrected in file Ref. 16d. **Item closed.**
13. It was verified that the PP rounded down the ER correctly, thus the new ER are 286,328 tCO₂. **Item closed.**
14. The PP eliminated the data called "Life time" (0.17 and 1 year) from the ER excel file (ref 14d), it is deemed correct because this data is not related with the monitoring plan and was not related with any calculation. **Item closed.**
15. It was verified that the value used by the PP is correct, it was crosschecked against a third information source <http://www.kylesconverter.com/>. Additionally it is word to mention that the observation done has impact only in the 13 significant figure. **Item closed**

CAR 2 was closed.

Acceptance and Close out by Lead Assessor:

Date: 07/02/2013

Date:	22/11/2012	Raised by:	Alicia Fernández		
Type:	CL	Number:	3	Reference:	AU4 section 6
Lead Assessor Comment:				Date: 22/11/2012	
Energy meters					
5. Please provide the calibration frequency recommended by the manufacturer of the energy meter (ITRON) located in Chuspipata. 6. As per MR version 1, the meters of Chojlla Antigua 1 & 2 (gross generation) were changed on March 2011. Please revise the date of the change (meters s/n 2008232368 & 2006338411) and its consistency with the calibration certificates (ref 19 & 21) and provide the corresponding log books. 7. Please provide the calibration certificate corresponding to the calibration done on 18/04/2011 to the meter serial number 2008232368 located in Chojlla Antigua 1 Generator terminal and on 31/08/2010 to the meter serial number 2006338411 Chojlla Antigua 2 Generator terminal 8. It was found that meter Chojlla Antigua 1 Generator terminal, s/n 2006338412 operated with the calibration delayed from 19/03/2011-08/06/2011 and that that meter Chojlla Antigua 2 Generator terminal, s/n 2006338410 operated with the calibration delayed from 19/03/2011-08/06/2011. Please clarify why the duly correction of data as per VVS paragraph 238 was not done.					
CL 3 was raised.					
Project Participant Response:				Date: 14/12/2012	
1. The calibration frequency recommended by the ITRON company personnel is 4 years. 2. The meters of Chojlla Antigua 1&2 were changed on 18/03/2011 (s/n 2006338412 and 2006338410 respectively). These meters were sent to the SEL factory to inspection and calibration. The meters were returned with a new calibration certificate and re installed in Chojlla Antigua 1&2 on 08/07/2011. In order to replace the previous devices, the meters with s/n 2008232368 and 2006338411 were installed in Chojlla Antigua 1&2 respectively. These meters were functionally from 18/03/2011 to 08/07/2011. 3. The calibration certificate of the meters s/n 2008232368 and 2006338411 is provided. 4. The meters Chojlla Antigua 1&2 Generators terminal, s/n 2006338412 and 2006338410 operated with the calibration delayed from 01/03/2011 to 18/03/2011. Since there is a period without valid certificates, the PP has applied VVS page 238 to the recordings of the meters for the period lacking a valid calibration certificate. A maximum permissible error of 0.2 % is applicable to the meter recordings.					
Documentation Provided as Evidence by Project Participant:					
1. Reference 4: An e-mail from Mr Ricardo A. Selegatto – ITRON is made available mentioning the period of the calibration. Ref4.PeriodCalibITRON (PDF file). Reference 5. Also a letter from Mr. Marco A. Villegas - ITRON representative in Bolivia is make available. Ref5.083 carta HB SL7k (PDF file). 2. Reference 6: An e-mail from Mr. Froilan Quiroz – Operation Chief of HB, including the date of meter changes. Ref6.CambioMedOperc (PDF file) Reference 6.1: An e-mail explaining the reasons of sending the meters to SEL factory. Ref6.1 ReporteCambioMedidores. (PDF file) Reference 6.2: A Daily Report from Operation and Maintenance section of HB mentioning the change made on 18/03/2011. Ref6.2.1103_ParteDiario O&M. (PDF file) Reference 6.3: A Daily Report from Operation and Maintenance section of HB mentioning the change made on 08/07/2011. Ref6.31107_ParteDiario O&M. (PDF file) Reference 7. Chojlla Antigua 1 data meter (directly downloaded from the SEL meter s/n 2006338412) is available including the period: 01/03/2011 - 18/03/2011 at 16:30. Ref7.CJL1cjl002_110301_18. (CSV file) Reference 8. Chojlla Antigua 1 data meter (directly downloaded from the SEL meter s/n 2008232368) is available including the period: 18/03/2011 - 31/03/2011 at 24:00. Ref8.CJL1cjl002_110318_31. (CSV file) Reference 9. Chojlla Antigua 1 data meter (directly downloaded from the SEL meter s/n 2008232368) is available including the period: 01/07/2011 - 08/07/2011 at 17:00. Ref9.CJL1cjl002_1107. (CSV file)					

Reference 10. Chojlla Antigua 1 data meter (directly downloaded from the SEL meter s/n 2006338412) is available including the period: 08/07/2011 (to 19:00) - 31/07/2011 to 24:00. Ref10.CJL1cjl002_1107desde el 8 de julio. (CSV file).

Reference 11. Chojlla Antigua 2 data meter (directly downloaded from the SEL meter s/n 2006338410) is available including the period: 01/03/2011 - 18/03/2011 at 16:45. Ref11.CJL2cjl002_110301_18. (CSV file)

Reference 12. Chojlla Antigua 2 data meter (directly downloaded from the SEL meter s/n 2006338411) is available including the period: 01/03/2011 - 31/03/2011 at 24:00. In the period: 01/03/2011 – 18/03/2011 the meter was installed in the power line of Chojlla Antigua 1&2, then from 18/03/2011 (at 18:45) to 31/03/2011 the meter data include the Chojlla Antigua 2 generation, see column E (it has not inverse power). Ref12.CJL2cjl002_110318-31. (CSV file).

Reference 13. Chojlla Antigua 2 data meter (data from the SEL meter s/n 2006338411) is available including the period: 01/07/2011 - 08/07/201. Ref13.CJL2cjl002_1107. (CSV file)

Reference 14. Chojlla Antigua 2 data meter (directly downloaded from the SEL meter s/n 2006338410) is available including the period: 08/07/2011 (to 18:15) -31/07/2011 to 24:00. Ref14.CJL2cjl002_1107desde el 8 de julio. (CSV file).

Reference 14.1. Resumen del Despacho de Carga Realizado 08/07/2011, CNDC. (As it can see in the logs, Chojlla Antigua 2 was unavailable (zero records), which can be verified in the CNDC Post-dispatch report, spreadsheet: EVENTOS). Ref14.1.dc_080711. (EXCEL file).

3. Reference 15. The calibration certificate of the meters with s/n 2008232368 and 2006338411 is provided. Ref15.CCertificat. (PDF file).

4. EXCEL file: “b) HB GGEN 11mar-12jun”, spreadsheet: “mar11-jun12 GGen”, columns “Q&R”. A maximum permissible error of 0.2 % is applicable to the meter recordings.

Information Verified by Lead Assessor:

PeriodCalibITRON (PDF file) – ref 57
083 carta HB SL7k (PDF file)- ref 56
CambioMedOperc (PDF file) – ref 58
ReporteCambioMedidores. (PDF file) – ref 59
1103_ParteDiario O&M. (PDF file) – ref. 60
31107_ParteDiario O&M. (PDF file) – ref. 61
CJL1cjl002_110301_18. (CSV file) – ref. 62
CJL1cjl002_110318_31. (CSV file) – ref. 63
CJL1cjl002_1107. (CSV file) – ref. 64
CJL1cjl002_1107desde el 8 de julio. (CSV file). – ref. 65
CJL2cjl002_110301_18. (CSV file) – ref.66
CJL2cjl002_110318-31. (CSV file - ref. 67
CJL2cjl002_1107. (CSV file) – ref. 68
dc_080711. (EXCEL file) – ref. 69
CJL2cjl002_1107desde el 8 de julio. (CSV file) - ref. 70
CCertificat. (PDF file) – ref. 46&47
HB GGEN 11mar-12jun.xlsx - ref 16b

Reasoning for not Acceptance or Acceptance and Close Out:

5. It was verified that the meter manufacturer acknowledge a operation period of 15 years without lost its accuracy, and recommend to check the calibration every 4 years (ref 56 & 57). It was verified as well that MR (ref 6b) was updated according with the calibration frequency suggested by the manufacturer (4 years). **Item closed.**

6. During the site visit it was verified that the gross generation of Chojlla Antigua 1 & 2 was being measured by the meters s/n 2006338412 and s/n 2006338410 (ref 48, pic 6). As per the information reports in MR version 2 (ref 6b) the meters s/n 2008232368 & 2006338411, measured the generation in the cited point from 19/03/2011 to 08/07/2011, while meters s/n 2006338412 and s/n 2006338410 were in operation from 01/03/2011 to 18/03/2011 and from 08/07/2011 to 30/06/2012. The dates of operation of each pair of meters were verified during site visit against the daily reports and the generation records. In order to keep the information the PP provided a copy of the daily reports (ref 60 & 61) and the generation records (ref. 62 to 70). Item closed.	
7. The missing calibration certificates (ref 46&47) were received, it was verified that the calibration dates of meters s/n 2008232368 and 2006338411 reported in MR version 2 (ref 6b) are correct. Item closed.	
8. As it was reported in item 2, the gross generation of Chojlla Antigua 1 & 2 was measured by the meters s/n 2006338412 and s/n 2006338410 (ref 48, pic 6) in the periods from 01/03/2011 to 18/03/2011 and from 08/07/2011 to 30/06/2012. Thus MR version 1 (ref 6a) reported wrongly the operation period of these meters. Therefore according with the verified information, meters s/n 2006338412 & 2006338410 operated with a delayed calibration from 01/03/2011 until 18/03/2011. It was verified that the PP applied correctly VVS paragraph 238 a)&b)., and the maximum error between the maximum permissible error of the instrument and the error found in the delayed calibration (ref 19&21) was applied. The maximum error (0.2%) is applied over "Old Chojlla 1&2" in a conservative manner from 01/03/2011 until 18/03/2011 in the calculation file named "b) HB GGEN 11mar-12jun.xlsx" (ref 16b), tab "mar11-jun12 GGen", cells Q2:R434. CL 3 item 4 closed.	
CL 3 was closed (02/01/2013), CL 3 has been re-opened (31/01/2013).	
Acceptance and Close out by Lead Assessor:	Date: 02/01/2013, 31/01/2013
Project Participant Response:	Date: 06/02/2013
- The validity date of the calibration of the meter 20006338411 was corrected in the MR, section D.2. - The previous calibration performed to the meters: 2008232368, 2006338412 & 2006338410 were included in the MR, section D.2.	
Documentation Provided as Evidence by Project Participant:	
- Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section D.2. - Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v4"), section D.2.	
Information Verified by Lead Assessor:	
- Mar11-Jun12_HB1031_MR_v4 (ref 6d) - Calibration certificates (ref. 20, 28 & 29)	
Reasoning for not Acceptance or Acceptance and Close Out:	
- It was verified that MR version 4 (ref 6d) informs the correct validity of the calibration of meter 2006338411 as per the frequency recommended by the manufacturer. Item closed. - It was verified that MR version 4 (ref 6d) reports all the calibrations related with meters 2008232368, 2006338412 & 2006338410, they are correct against the certificates (ref. 20, 28 & 29 respectively). Item closed.	
CL 3 was closed.	
Acceptance and Close out by Lead Assessor:	Date: 07/02/2013

Date:	22/11/2012	Raised by:	Alicia Fernández		
Type:	CL	Number:	4	Reference:	AU4, Section 3
Lead Assessor Comment:			Date: 22/11/2012		
Calculation procedures					
1. Please clarify why a whole set of data (1 year) was not used to obtain the EF EL,m,y.					
2. Please clarify where is defined the percentage (x%) that corresponds to the top of the dispatch, as per the requirement of the Tool to calculate the grid emission factor version 1.1).					
CL 4 was raised.					
Project Participant Response:			Date: 14/12/2012		
1. It was assumed that the first period from 01/03/2011 to 30/06/2011 was a complementation of the last verification period (from 01/07/2010 to 28/02/2011). In order to have a whole set of data to obtain EF EL,m,y, a complete annual data is used from 01/07/2010 to 30/06/2011.					
2. The group of power units “n” in the dispatch margin that includes the units in the top x% of total electricity dispatched in the hour h, was assumed just as a 10%. However, as per the requirement of the Tool to calculate the grid emission factor version 1.1, the greater of either 10% or the quantity of electricity displaced by the project activity during hour h divided by the total electricity generation in the grid during that hour h is now applied.					
Documentation Provided as Evidence by Project Participant:					
1. EXCEL Baseline files: “1.1) 10jul-10oct”, “1.2) 10nov-11abr”, “1.3) 11may-11oct”, spreadsheets: “EFx%”, and EXCEL file “2) Annex3 v2.0”, spreadsheet: “Annex3”.					
2. EXCEL Baseline files: “1.1) 10jul-10oct”, “1.2) 10nov-11abr”, “1.3) 11may-11oct”, “1.4) 11nov-13abr” and “1.5) 12may-12jun”, spreadsheet: “HierMWh x%”.					
Information Verified by Lead Assessor:					
1.1) 10jul-10oct.xls – ref 9b, version 1, data and calculation reviewed.					
1.2) 10nov-11abr.xls – ref. 10b, version 2, data and calculation reviewed.					
1.3) 11may-11oct.xls – ref. 11b, version 2, data and calculation reviewed.					
1.4) 11nov-13abr.xls – ref. 12b, version 2, data and calculation reviewed.					
1.5) 12may-12jun.xls – ref 13b, version 2, data and calculation reviewed.					
2) Annex3 v2.0.xlsx - ref. 14b, version 2, data and calculation reviewed. Dated 14/12/2012.					
Reasoning for not Acceptance or Acceptance and Close Out:					
1. The PP modified the EFom calculation and considered one full year (july/2010-june/2011 and july/2011-june 2012) to obtain the EFcm. The compliance of the calculation procedure was assessed again against Tool to calculate the emission factor for an electricity system (version 1.1), where it is stated that “ <i>The dispatch data analysis OM emission factor ($EF_{grid,OM-DD,y}$) is determined based on the power units that are actually dispatched at the margin during each hour h where the project is displacing electricity. This approach is not applicable to historical data and, thus, requires annual monitoring of $EF_{grid,OM-DD,y}$”.</i> Therefore based on the Tool the PP is requested to revise the EFom calculation. Item remains open.					
2. It was verified that the PP included properly the comparison between 10% and the quantity of electricity displaced by the project per hour. The excel files corresponding to references 9b, 10b, 11b, 12b and 13b, tab “HierMWh x%”, column CC contain the x%, which is the maximum between 10% and the quantity of electricity displaced by the project per hour. Later the x% is used to define the units in the top of the dispatch. Item closed. Please correct the procedure to define the units in the top of the generation (MR page 19), it is not correct as per the Tool and the calculation procedure followed. Please revise the same issue in the revised PDD. Item open.					
CL 4 remains open.					
Acceptance and Close out by Lead Assessor:			Date: 03/01/2013		
Project Participant Response:			Date: 07/01/2013		

1. The first period of the current MR is customized, from 01/03/2011 to 30/06/2011, and is considered as the complement for the calendar semester started and considered in the previous verification period (01/07/2010 to 28/02/2011). The values of the said first period are used to obtain the EF_{EL,m,y} parameter.

2. The procedure to determine the units in the top of the generation was amended and corrected in the updated MR, section B.2.4 and section E.1. The same was implemented in the revised PDD. Likewise, it has been verified that the said modifications have no impact or effect on the previous calculated values, please see Annex3 of the revised PDD.

Documentation Provided as Evidence by Project Participant:

1. MS-EXCEL Baseline files: "1.1) 11mar-11abr", "1.2) 11may-11oct", "1.3) 11nov-12abr", "1.4) 12may-12jun" spreadsheets: "EFx%"; and EXCEL file "2) Annex3 v3.0", spreadsheet: "Annex3".

2. Reference 2: Updated version of the MR (MS-WORD file: "Ref2.Mar11-Jun12_HB1031_MR_v3"), section E.1.

Reference 1: Updated version of the PDD (MS-WORD file: "Ref1.HB_PDD_v4 "), section B.6.1.

Reference 33: Baseline calculation of the revised PDD (ZIP file: "Ref33.BasLin_PDD_3").

Information Verified by Lead Assessor:

- 11mar-11abr, ref 10b, Monthly spreadsheet containing the input data for the ERs calculations for the period November 2010 - April 2011. Version 3.
- 11may-11oct – ref 11b. Monthly spreadsheet containing the input data for the ERs calculations for the period May 2011 to October 2011. Version 3.
- 11nov-12abr – ref 12b. Monthly spreadsheet containing the input data for the ERs calculations for the period November 2011 to April 2012. Version 3.
- 12may-12jun – ref 13b. Monthly spreadsheet containing the input data for the ERs calculations for the period May 2012 to June 2012. Version 3.
- 2) Annex3 v3.0 – ref 15c . ERs calculations spreadsheet and grid emission factor. Version 3.
- HB_PDD_v4 – Revised PDD version 4, revised PDD version 4 dated 06/02/2013
- BasLin_PDD_3- Ref 87b, Updated Calculations file to obtain EF_{om} at the renewal of the crediting period.
- Annex 3 to PDD – Ref 87a, Calculations file to obtain EF_{om} at the renewal of the crediting period.
- Mar11-Jun12_HB1031_MR_v3, MR version 4. MR version 4 dated 06/02/2013
- BasLi_Jul09_Feb11 v2.0x_15092011, Ref 87c, Calculations file to obtain EF_{cm} for CP2 MP1

Reasoning for not Acceptance or Acceptance and Close Out:

1. It was verified that the calculation file was corrected by the PP considering the data equivalent to the period of time for which the ER are being claimed. It was verified that this approach is correct against the Tool (ref 5), that states "This approach is not applicable to historical data and, thus, requires annual monitoring of EF_{grid,OM-DD,y}". **Item closed.**

2. The revised PDD ref (1c) on page 28 corrected the procedure to determine the units that are in the top of the dispatch. It was verified that new procedure is correct against the definitions of the Tool (ref 5).

Since this correction has impact over the EF_{om} value determined ex-ante (at the renewal of the crediting period), the PP provided the updated calculation files (ref 87b) considering the vintage November 2007-October 2008. The comparison between 10% and the % of energy generated by the project is now compared in the files (07nov-08abr.xls; 08may-08oct.xls, ref 87b), tab "HierMWh x%". Therefore the emissions reported hourly for the units in the top of the dispatch in the tab "EFx%" are now correct. It was found that in most on the cases the x% was lower than 10%, thus the impact of the correction done lead to some minor changes in the intermediate values, but finally the EF_{om} determined for ex-ante purposes did not change and remains as 0.64 tCO₂/MWh.

Analogously it was reviewed the revised calculation corresponding to the CP2 MP1 (ref 87c), it was verified that the correct application of the procedure does not have impact over the final ERs. Thus it has been validated that this change introduced to the PDD does not have impact over the previous crediting period.

Similarly the calculations done for the period under assessment were verified (ref 10c, 11c, 12c, 13c & 15c). It was validated that the even in some hours the generation of the project was over 10%, the final value of EF_{om} did not change because it happened rarely and the % of the project always was so close to 10% (no more than 17%).

The change introduced to the PDD does not require prior approval because as per Annex 1 of PS version 2 (EB 70 annex 2) the change introduced classifies as paragraph 6a *“the applicability and application of the applied methodology under which the project activity has been registered”*. As it was previously described, the change introduced was done to follow a calculation procedure as it is defined by the applicable Tool (ref 5). Therefore, the revised PDD (ref 1c) follows correctly the application requirements of ACM0002 version 8 (ref 3) and the Tool to calculate the grid emission factor version 1.1 (ref 5).

On the other hand it was validated that the change does not threaten PS (EB 70 annex 2), section 4, paragraph 6b&c *“Proposed or actual changes to the project design of a registered CDM project activity that do not adversely impact any of the following do not require prior approval by the Board”*:

- *The additionality of the project activity*; the change does not have any impact in the additionality because is a correction in the calculation procedure to follow correctly the applicable methodology and Tool.
- *The scale of the project activity*; the project classifies as a “large scale project”, the change introduced does not have any impact in the project scale.

Item closed.

CL 4 was closed.

Acceptance and Close out by Lead Assessor:

Date: 15/01/2012

Date:	28/11/2012	Raised by:	Alicia Fernández		
Type:	CL	Number:	5	Reference:	Site visit
Lead Assessor Comment:			Date: 28/11/2012		
Emergency generators During the site visit it was found that there are 3 emergency generators (1 in Yanacachi, 1 in Chojlla and 1 in the pondage). Please provide the information of the diesel consumption of the cited generators. CL 5 was raised.					
Project Participant Response:			Date: 14/12/2012		
The 3 generators: 1 in Yanacachi Norte power plant, 1 in Chojlla power plant and 1 in Cacapi pondage are emergency generators. These 3 emergency generators are diesel fired. The fuel consumption of these generators is controlled through dispatch quantities from workshops. The amounts of diesel are registered in a form. The following table shows emissions from emergency generators which are less than 0.01% of the total emission reductions of the project.					
Period	Emissions Reductions [tCO2]	Diesel Oil Emergency Gen [LT]			Emissions Emergency Gen [tCO2]
	Project Tot	Chj	Yan	Cac	Chj Yan Cac Tot % Tot
01/07/2010 - 30/06/2011	199,088	1,304	1,400	740	3.72 4.00 2.11 9.83 0.005%
01/07/2011 - 30/06/2012	211,679	730	785	1,340	2.08 2.24 3.83 8.15 0.004%
Total					17.99 0.004%
Documentation Provided as Evidence by Project Participant:					
Reference 16. Diesel consumption form. Ref16.DieselConForm. (PDF file).					
Reference 17. Calculation of CO2 emission of the generators. Ref17.EmergencyGen. (EXCEL file).					
Information Verified by Lead Assessor:					
DieselConForm.pdf – ref 74 EmergencyGen.xlsx – ref 75					
Reasoning for not Acceptance or Acceptance and Close Out:					
It was verified that the PP records the diesel consumption in the form “Kardex de control de combustibles y lubricantes” (control record of fuel and lubricant) (ref 74). It was verified that the diesel consumption summarised by the PP in the answer is correct against the records (ref 74). Regarding calculation to obtain the CO2 emissions, they were done correctly as per the “Tool to calculate project or leakage CO2 emissions from fossil fuel combustion” (EB 41 annex 11) in the file “EmergencyGen.xlsx” (ref 75), however the Carbon content at the lower limit was used. It was verified that whether the upper carbon content is used, the percentage of project emission (by diesel consumption) would be 0.0045%, still under 1%. It was verified that the diesel consumption of the emergency generators was not considered at the validation time following the principle “The validation report shall contain information regarding greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed CDM project activity which are expected to contribute more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology.” (VVM version 1.1. valid at the re-validation time). As per ACM0002 version 8, PE = 0 . Additionally as reference it can be highlighted that ACM0002 version 13 states “The use of fossil fuels for the back up or emergency purposes (e.g. diesel generators) can be neglected.”. Therefore considering that the emissions by diesel consumption at the emergency generators are lower than 1% of the emission reductions and the approach of ACM0002 (version 8 and 13), it is deemed correct to left aside of the emission reduction calculation the emission due to the diesel consumption of the emergency generators.					
CL 5 was closed.					
Acceptance and Close out by Lead Assessor:			Date: 03/01/2012		

Date:	28/11/2012		Raised by:	Alicia Fernández																
Type:	CAR	Number:	6	Reference:	AU4 section 6 Site visit															
Lead Assessor Comment:			Date: 28/11/2012																	
Injection Point																				
- As per MR version 1, parameter $EG_{PJ,h}$, a new meter of HB is located in "Chuspipata". Please clarify the role of this new meter and its impact in the registered Monitoring Plan. Additionally please provide the supporting evidence related with the installation date (01/05/2012). - During the site visit it was found that the injection point of the project was changed from Kenko Node to Chuspipata Node. PP is requested to address this change as per VVS version 3 and PS version 2 (Post-registration changes).																				
CAR 6 was raised.																				
Project Participant Response:			Date: 14/12/2012																	
1. According to the Bolivian Electricity Law No 1604, Kenko node is part of the Trunk Integrated Grid of Bolivia power system. Until 30/04/2010 the Kenko Node was considered as a HB's injections node since this was the closest Node to HB's system. According to the Supreme Decree No 488 as of 28/04/2010, the Chuquiaguiño – Caranavi transmission line has been incorporated to the Trunk Integrated Grid. The Chuspipata node is immersed in the Chuquiaguiño – Caranavi line. Then, the Chuspipata Node became the closes nodal point for HB. Since changes were made, the CNDC emitted on 18/05/2010 a report that indicates that companies must adapt their measuring system. In order to comply with CNDC's instructions, HB completed the installation of a metering system in Chuspipata Node on 30/04/2012. From 01/05/2012, the data of this meter is used in the commercial/revenue measurement system by the CNDC (see the document "Documento de Transacciones Economicas N06-2012"). Since the Monitoring Plan of the PDD reports the Kenko Node as HB's injection point, it is necessary to update the Monitoring Plan. The ITRON meter was installed in Chuspipata Node on 30/04/2012 (please see the records of the meter). On 14/05/2011 CNDC personnel made the inspection to the metering system. According to the document "Documento de Transacciones Economicas N06-2012", the data is used for the commercial/revenue measurement system (SMEC) since 01/05/2012. Impacts on the injection node change are reflected in the energy losses and marginal costs. There was a reduction of 6% to 3% in the transmission since Chuspipata is closer to HB's system than Kenko. Also, a reduction of the marginal cost, since marginal losses of energy that occurs in the transmission system (which are in function of the increasing generation of the marginal unit due the energy injected by generators or withdrawn by loads) was in decrement. The reduction was from 19.5 US\$/MWh to 18.8 US\$/MWh in the marginal cost. The next table illustrates an example considering the production of 2011, no relevant impact is perceived. <table border="1"> <thead> <tr> <th>Node</th><th>Gross Energy [MWh]</th><th>Losses [%]</th><th>Marginal Cost [US\$/MWh]</th><th>Income [USD]</th></tr> </thead> <tbody> <tr> <td>Kenko</td><td>330,455</td><td>5.9</td><td>19.48</td><td>6,057.46</td></tr> <tr> <td>Chuspipata</td><td>330,455</td><td>2.8</td><td>18.85</td><td>6,054.66</td></tr> </tbody> </table>						Node	Gross Energy [MWh]	Losses [%]	Marginal Cost [US\$/MWh]	Income [USD]	Kenko	330,455	5.9	19.48	6,057.46	Chuspipata	330,455	2.8	18.85	6,054.66
Node	Gross Energy [MWh]	Losses [%]	Marginal Cost [US\$/MWh]	Income [USD]																
Kenko	330,455	5.9	19.48	6,057.46																
Chuspipata	330,455	2.8	18.85	6,054.66																
2. In order to comply with the instruction of the CNDC, HB installed a metering system in Chuspipata Node which has become the injection node. Therefore the update version of the PDD includes this change as shown in section B.7.1.																				
Documentation Provided as Evidence by Project Participant:																				

1. Reference 18. Bolivian Electricity Law No 1604 (Kenko Node is part of the Trunk Integrated Grid, page52). Ref18.Ley 1604. (PDF file).

Reference 19. Sistema de Medicion Comercial del Mercado Electrico Mayorista Boliviano (HB's injections are referred to Kenko Node, page8). Ref19.rsmec_0308. (PDF file).

Reference 20. Decreto Supremo No 0488 (Chuquiaguillo – Caranavi transmission line was incorporated to the Trunk Integrated Grid, page2). Ref20.DS_0488_10. (PDF file).

Reference 21. Adecuacion del sistema de medicion comercial del area norte en aplicacion del Decreto Supremo N488. (HB must adapt their measuring system, page14). Ref21.inf023_10. (WORD file).

Reference 22. Punto de medicion commercial de HB en la S/E Chuspipata 115 kV. (Installation report of the metering system in Chuspipata Node). Ref22.HB.RMI.0298.12. (PDF file).

Reference 23. Data of ITRON meter in Chuspipata downloaded directly from the meter. Ref23.Partial read of load profile-01-2012-05-02-09-33-38. (EXCEL file).

Reference 24. Acta de Recepcion del Sistema de Medicion Comercial de Hidrobol en S/E Chuspipata 115 kV (CNDC personnel made the inspection to the metering system). Ref24.0629.12. (PDF file).

Reference 25. Documento de Transacciones Economicas N06-2012 (From 01/05/2012 The meter is considered within the Commercial Measurement System, page3). Ref25.tran0612. (PDF file).

Reference 26. Sistema de Medicion Comercial del Mercado Electrico Mayorista Boliviano (HB's injections are referred to Chuspipata Node, page29). Ref26.rsmec_2012. (PDF file).

Reference 27. Informe de Precios de Nodo 30042010 (Taqesi's energy losses to Kenko, page14). Ref27.Informe de Precios de Nodo 30042010. (WORD file).

Reference 28. Informe de Precios de Nodo 12042012 (Taqesi's energy losses to Chuspipata, page16). Ref28.Informe de Precios de Nodo 12042012. (WORD file).

Reference 29. Memoria 2011 CNDC (Energy prices of the main nodes of Trunk Integrated Grid, annex page17). Ref29.memyres_2011. (PDF file).

Reference 30. Generacion Bruta 2011 CNDC (Gross Energy 2011). Ref30.genbruta_2011. (EXCEL file).

2. Reference 2: Updated version of the MR, Ref2.Mar11-Jun12HB1031_MR_v2 (WORD file), section B.7.1.

Information Verified by Lead Assessor:

Ley 1604.pdf - ref 76
rsmec_0308.pdf – ref 77
DS_0488_10.pdf – ref 78
inf023_10docx – ref 79
HB.RMI.0298.12.pdf – ref 80
Partial read of load profile-01-2012-05-02-09-33-38.xlsx – ref 81
0629.12.pdf – ref 82
tran0612.pdf – ref 83
rsmec_2012.pdf – ref 84
Informe de Precios de Nodo 30042010.docx – ref 85
Informe de Precios de Nodo 12042012.docx – ref 86
memyres_2011.pdf – ref 40
genbruta_2011.xlsx – ref 88
Mar11-Jun12_HB1031_MR_v2.docx – ref 6b

Reasoning for not Acceptance or Acceptance and Close Out:

It was verified that as per the Supreme Decree 488 (ref 78) issued on 28/04/2010 were incorporated to the interconnected system the lines “Chuquiaguillo-Chuspipata” and “Chuspipata-Caranavi”. Similarly it was verified as per the CNDC report N°23, issued on 18/05/2010 (ref 79), that the injections of Hidroelectrica Boliviana will be considered at Chuspipata instead Kenko. It was verified as well that the CNDC (grid operator) formalised in the Document of economic transactions (ref 83) that from 01/05/2012 the SMEC (system of commercial measurements) recognizes the meter located in Chuspipata sub-station as the valid to measure the injection from line Pichu, which transport the energy generated by Hidroelectrica Boliviana.

On the other hand it was verified against the formal notification to the CNDC (ref 80) that the meter Itron s/n 53120604 was installed on 30/04/2012, and it become the formal meter for the SMEC is from 01/05/2012. The information is consistent and correct against the DTE (ref 83). It was verified that the new meter (located in Chuspipata) involved has the same accuracy (0.2) (ref 27, 80 & 82) than the meters previously involved, therefore the change introduced in the Monitoring Plan does not reduce the accuracy of the measurements. It was found that the calibration date of meter s/n 53120604 reported in MR version 2(ref 6b) is correct against the certificate (ref 27).

It was verified that the change introduced to the Monitoring Plan in the PDD does not require prior approval because it complies with the Project Standard version 2, Annex 1, paragraph 5a &c. As it was verified and reported previously the change of the node that accounts the injections of Hidroelectrica Boliviana to the grid was mandated by law (ref 78) and executed according to the local regulation (ref 83), therefore the change is not within the control of the project participant.

Similarly the change introduced does not threaten the following aspects:

- *applicability and application of the methodology*, the change of the node where HB's injections are recorded is not related with the applicability conditions defined in ACM0002 version 8.

- *the additionality*, according with the line diagram available in the CNDC report N°32 (ref 79) Chuspipata node is closer to HB than Kenko node, therefore the HB has lower transmission losses accounting its injection in Chuspitapata node. As per PP information the transmission losses decrease from 6% to 3%. Please provide the sources that support the change in the marginal cost (19.5 US\$/MWh to 18.8 US\$/MWh) and in the transmission losses (6% to 3%).

It was verified against the Node price report 2010 (that illustrate HB's injection in Kenko) and 2012 (that illustrate HB's injection in Chuspipata) (ref 85 and 86), that the transmission losses were 5.9% (in Kenko) and 2.8% (in Chuspipata). Similarly it was verified against the annual report issued by the CNDC (ref 40) that the energy price in Kenko node was 19.48 US\$/MWh, while in Chuspipata node was 18.85 US\$/MWh.

It was verified that incomes are lower accounting the HB's injection in Chuspipata node, because even they face lower losses they receive a lower price. Therefore according to the following equation always the incomes will be lower in Chuspipata node.

Incomes = Energy sold * Energy price

Energy sold Chuspipata = energy sold Kenko * (1.059-1.028) = energy sold Kenko * 1.031

Energy price Chuspipata = Energy price Kenko * (18.8 / 19.5)

Thus,

Incomes Chuspipata = energy sold Kenko * 1.031 * Energy price Kenko * (18.85 / 19.48)

Incomes Chuspipata = energy sold Kenko * Energy price Kenko * 0.997

Therefore HB is not receiving more incomes due to the change in the node that accounts HB's injections, thus the project profit is not improved.

- *the scale of the project*, the change introduced does not have relation with the installed capacity of the project, therefore the project continue as a large scale project.

2. It was verified that MR version 2 (ref 6b), section 2.3 reports the change of the node where injections of Hidroelectrica boliviana are accounted. MR states "*HB's injection node has changed. In the registered monitoring plan, Kenko node was statement as HB's injection node. "Consequence fo the Supreme Decree No 488 emitted on 28/04/2010 by Bolivian Government, since 01/05/2010 Chuspipata node has become as the HB's injection node."* Please revise and clarify the date since Chuspitata is the node to account HB's injections. **Item remains open.**

Please refer to the change of the node that accounts HB's injection in MR section B.1. **Item open.**

The updated PDD version 3 (ref 1b) was reviewed, it was verified that section B.7.1. was modified, it was deleted “Kenko” as the injection node. Thus revised PDD for parameter $EG_{PJ, h}$ states “HB’s injections at node of the Trunk Integrated Grid for HB, where its billing is referred to, are measured through the Commercial Recording System, a meters’ system remotely accessed from HB’s and CNDC’s premises. This data is hourly measured and monthly recorded. Project’s deliveries at Pichu substation is measured through HB’s own metering system and used to deduct from measurement records at node of the Trunk Integrated Grid, the injections of HB’s non-Project’s sources following the procedure described below:...”.

Considering that in some future the node to account the HB’s injection to the grid can be changed by the authority, the change introduced is deemed correct because the new Monitoring Plan refers to the node where the billing is considered.

CAR 6 remains open.

Acceptance and Close out by Lead Assessor:	Date: 03/01/2012
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Project Participant Response:	Date: 07/01/2013
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1. Chusipata node is a Trunk Integrated Grid node as of 01/05/2010 and therefore the node at which HB’s energy injections are accounted for. HB completed the installation of a new metering system in Chusipata Node on 30/04/2012. As of 01/05/2012, the data of this meter is used in the commercial/revenue measurement system by the CNDC.

2. The change of the node that accounts for HB’s injection was described in the section B.1 of the updated MR.

Documentation Provided as Evidence by Project Participant:

1. Reference 31: Documento de Transacciones Economicas N04-2010 (Until 30/04/2010 the Kenko node was considered as the HB’s injection node, page5). Ref31.tran0410. (PDF file).

Reference 32: Documento de Transacciones Economicas N05-2010 (Since 01/05/2010 the Chusipata node is considered as the HB’s injection node, page5). Ref32.tran0510. (PDF file).

2. Reference 2: Updated version of the MR (MS-WORD file: “Ref2.Mar11-Jun12_HB1031_MR_v3”), section B.1.

Information Verified by Lead Assessor:

Mar11-Jun12_HB1031_MR_v3 – Ref. 6c, Monitoring report version 3, dated 07/01/2013

tran0410 – Ref. 94, Document of economic transactions, April 2010

tran0510 – Ref. 95, Document of economic transactions, May 2010

Reasoning for not Acceptance or Acceptance and Close Out:

1. It was verified that MR version 3 (ref 6c), section B.2.3., reports correctly the fact that as per the local regulation the node where HB’s injection will be accounted is “Kenko”, and that from 01/05/2012 is operating the new meter that is part of the SMEC. **Item closed.**

2. It was verified that MR version 3 (ref 6c), section B.1., reports the new meter that is part of the set of meters that are involved with the monitoring of the electricity generated by the project. **Item closed.**

CAR 6 was closed.

Acceptance and Close out by Lead Assessor:	Date: 14/01/2013
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10. Statement of Competence

Statement of Competence

Name: Alicia
Fernandez

Status

- Lead Assessor	x	- Expert	
- Assessor	x	- Financial Expert	
- Local Assessor	Bolivia	- Technical Reviewer	x

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)

Technical Area(s):

2. Energy Distribution

Technical Area(s):

3. Energy Demand

Technical Area(s):

4. Manufacturing

Technical Area(s):

5. Chemical Industry

Technical Area(s):

6. Construction

Technical Area(s):

7. Transport

Technical Area(s):

8. Mining/Mineral Production

Technical Area(s):

9. Metal Production

Technical Area(s):

10. Fugitive Emissions from Fuels (solid, oil and gas)

Technical Area(s):

11. Fugitive Emissions from Production and

Consumption of Halocarbons and Sulphur Hexafluoride

Technical Area(s):

12. Solvent Use

Technical Area(s):

13. Waste Handling and Disposal

Technical Area(s):

14. Afforestation and Reforestation

Technical Area(s):

15. Agriculture

Technical Area(s):

Approved Member of Staff by:

Siddharth
Yadav

Date:

04/02/2013

Statement of Competence

Name: David Watts

Status

- Lead Assessor	☐	- Expert	☒
- Assessor	☐	- Financial Expert	☐
- Local Assessor	☐	- Technical Reviewer	☐

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	☒
Technical Area(s): <i>TA 1.2 Energy generation from renewable energy sources</i>	
2. Energy Distribution	☐
Technical Area(s):	
3. Energy Demand	☒
Technical Area(s): <i>TA 3.1 Energy Demand</i>	
4. Manufacturing	☐
Technical Area(s):	
5. Chemical Industry	☐
Technical Area(s):	
6. Construction	☐
Technical Area(s):	
7. Transport	☐
Technical Area(s):	
8. Mining/Mineral Production	☐
Technical Area(s):	
9. Metal Production	☐
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	☐
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	☐
Technical Area(s):	
12. Solvent Use	☐
Technical Area(s):	
13. Waste Handling and Disposal	☐
Technical Area(s):	
14. Afforestation and Reforestation	☐
Technical Area(s):	
15. Agriculture	☐
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 30/01/2013

Statement of Competence

Name: Michael
Wu

Status

- Lead Assessor	x	- Expert	x
- Assessor	x	- Financial Expert	
- Local Assessor	China	- Technical Reviewer	x

Scopes of Expertise

1. Energy Industries (renewable / non-renewable)	x
Technical Area(s): TA 1.2 Energy generation from renewable energy sources	
2. Energy Distribution	
Technical Area(s):	
3. Energy Demand	
Technical Area(s):	
4. Manufacturing	
Technical Area(s):	
5. Chemical Industry	
Technical Area(s):	
6. Construction	
Technical Area(s):	
7. Transport	
Technical Area(s):	
8. Mining/Mineral Production	
Technical Area(s):	
9. Metal Production	
Technical Area(s):	
10. Fugitive Emissions from Fuels (solid, oil and gas)	
Technical Area(s):	
11. Fugitive Emissions from Production and Consumption of Halocarbons and Sulphur Hexafluoride	
Technical Area(s):	
12. Solvent Use	
Technical Area(s):	
13. Waste Handling and Disposal	
Technical Area(s):	
14. Afforestation and Reforestation	
Technical Area(s):	
15. Agriculture	
Technical Area(s):	

Approved Member of Staff by: Siddharth Yadav Date: 19/10/2012

11. Photographic Evidence

Unique reference number: s/n 2008232369

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 28/11/2012

Unique reference number: s/n 2008232367

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 29/11/2012

Unique reference number: s/n 012300419

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 29/11/2012

Unique reference number: s/n 012300420

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 29/11/2012

Unique reference number: s/n 53120604.

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 29/11/2012

Unique reference number: s/n 2006338412 - 2006338410.

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 28/11/2012

Unique reference number: s/n 023201485.

Name of equipment: Energy meter



Parameter: EGy/EG_{PJ,y}

Date: 29/11/2012

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History

Version	EB Requirement	Nature of revision	Validity
Issue 7	VVS version 03.0	Update to checklist to include VVS procedures	11 th January 2013
Issue 6	VVs Version 02.0	Update to checklist to include VVS procedures	25 th May 2012
Issue 5.4	VVM Version 01.2	Update to checklist	24 th February 2011