



**Hidroelectrica SA**

Verification of the monitoring  
report related to the period  
January 2009 - November  
2012 for the *Hidroelectrica*  
*Hydropower Development*  
*Portfolio Track I II* Project

189-2012\WB\Ek\bk

KPMG Sustainability  
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# 1 Verification statement

## Introduction

KPMG Advisory N.V. has been requested by S.C. Hidroelectrica S.A. (hereafter called Hidroelectrica) to examine the greenhouse gas (GHG) emission reductions related to the period January 2009 – November 2012 reported by Hidroelectrica in respect of the Joint Implementation (JI) Project *Hydropower Development Portfolio Track 1 JI Project*, for the reduction of 227,336 tones of CO<sub>2</sub> emissions.

The development and maintenance of records and reporting procedures in accordance with the Monitoring Plan dated 13 August 2008, including the preparation of the monitoring report of the project for the period January 2009 – November 2012, is the responsibility of the management of Hidroelectrica. The Monitoring Plan dated 13 August 2008 is part of the JI Project Design Document (PDD) and of the Project Proposal, awarded under a contract by Senter Internationaal (currently NL Agency) – the organization managing JI Projects for the Dutch Government, within the ERUPT II program. The JI Project (including the respective PDD and Monitoring Plan) was registered on the UNFCCC website on 11 March 2011, registration number RO1000253.

We have been engaged to express an independent verification opinion as to whether the Monitoring Report of the JI Project: *Hydropower Development Portfolio Track 1 JI Project* for the period January 2009 – November 2012, has been prepared, in all material aspects, in accordance with the Monitoring Plan for the project dated 13.08.2008.

KPMG Advisory N.V. cannot be held liable by any party for decisions made or not made based on this verification report.

## Basis of GHG verification opinion

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord.

Our approach is risk-based, drawing on an understanding of the risks associated with reporting of emissions reduction data and the controls in place to mitigate these risks. Our examination included an assessment, on a test basis, of evidence relevant to the amounts and disclosures in relation to the project's emission reduction units (ERUs) for the period January 2009 – November 2012.

We 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 the Monitoring Report for the project *Hydropower Development Portfolio Track 1 JI Project* for the period January 2009 – November 2012 has been prepared, in all material aspects, in accordance with the Monitoring Plan for the project.

We conducted our verification considering the Project Design Document including the project's Monitoring Plan dated 13 August 2008. Our work included:

- Collection of evidence supporting the reported data.
- Review and testing of the procedures and systems for data collection, measuring, monitoring and reporting.
- Checking whether the provisions of the Monitoring Plan dated 13 August 2008, were consistently and appropriately applied.

### **Verification opinion**

In our opinion, the Monitoring Report for the JI project: *Hydropower Development Portfolio Track 1 JI Project* for the period January 2009 – November 2012 has been prepared in all material aspects, in accordance with the Monitoring Plan for the project dated 13 August 2008.

Amsterdam, 21 December 2012

KPMG Advisory N.V.



W.J. Bartels  
Partner of KPMG Sustainability



## 2 Introduction

This chapter describes the objective, scope, limitations and methodology for this verification report. The project's key data are included in Appendix A.

Given that article 11b of Directive 2003/87/CE, with subsequent amendments, states that Emission Reduction Units (ERUs) generated by Joint Implementation Projects dealing with double counting under EU-ETS, need to be issued no later than 31 December 2012, Hidroelectrica was advised by NL Agency to rapidly organize the verification of the resulting emission reductions for the longest possible period of the year 2012, for which necessary data is available.

During the meeting of the EC Climate Change Committee held on 13 December 2012 in relation to forthcoming changes to EU Emission Trading Scheme (ETS) registry rules, it was decided that ERUs from projects hosted by Member States related directly or indirectly to activities which come under the scope of ETS in phase 2, may be issued by 31 December 2012.

NL Agency submitted an official letter to the Ministry of Environment and Forests (MOEF) in Romania, stating its acceptance of the verification of the Hidroelectrica JI project monitoring report for 2012, covering only the period January – November.

In the PDD of the project, the baseline scenario for determining the CO<sub>2</sub> emissions that would have occurred in the absence of the project, was foreseen to be established on an *ex post* basis, using the verified data for grid-connected Romanian power production installations under the EU ETS. For the calculation of the annually modified grid-based CO<sub>2</sub> baseline emission factor, a CO<sub>2</sub> Emission Factor data collection protocol was established. This protocol should have created a working relationship between the National Environmental Protection Agency (NEPA) and the National Agency for Energy Regulation (ANRE) for publication of an annual carbon emission factor (CEF) for EU ETS installations in Romania. Both Agencies should have cooperated under the co-ordination of the MOEF and the Ministry of Economy and Finance (currently Ministry of Economy and Business Environment). Unfortunately the above mentioned protocol was not operational by the end of 2012 and no annual CEF values were published.

Taking into account the situation related to the above mentioned protocol, Hidroelectrica requested the MOEF (letter no. 106671/29.11.2012) for approval to use a conservative CO<sub>2</sub> emission factor value of 0.833 t CO<sub>2</sub>/MWh calculated in the PDD of the JI project of CET Timisoara Centru in August 2006, also for the verification of the ERUs resulting from the current JI project in the period January 2009 – November 2012. The MOEF responded to this request (letter no. 37047/ED/11.12.2012) that this is acceptable under the condition that the CEF is calculated with methodology ACM0002 and the final CET value should remain below the maximum value of 1.1 t CO<sub>2</sub>/MWh for Romania included in the Communication of the Commission of the EU: "*Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012; Annex IV*".

The *Hidroelectrica Hydropower Development Portfolio Track 1 JI Project* delivers electricity to the power grid that would otherwise be generated by operation of grid-connected fuel fired power plants. The project is a *greenfield* project which created new capacity on sites where no electricity had been produced in the past. The initial project proposal described in the determined PDD consisted of the development and commissioning, in the period 2009 – 2012, of 9 new hydropower plants (Dumitra, Bumbesti, Nehoiasu II, Firiza I, Firiza II, Racovita, Rastolita, Raul Alb, Plopi and Robesti) located in different hydrographic basins in Romania.

It was expected that after project completion, 278.4 MW hydropower capacities would be installed, and the electricity generation would increase by 1532.35 GWh during the project's crediting lifetime.

For financial and technical reasons, from the 9 hydro power plants (HPP) included in the project only Raul Alb, Plopi and Robesti were commissioned in the above mentioned period.

## 2.1 Objective

The objective of the verification report is to provide reasonable assurance that the Monitoring Report for the project *Hydropower Development Portfolio Track 1 JI Project* for the new hydropower plants at Robesti, Plopi and Raul Alb related to the period January 2009 – November 2012 has been prepared, in all material aspects, in accordance with the Monitoring Plan of the project.

## 2.2 Scope

The scope of the current verification work consists of assessing the reported ERUs as stated in the Monitoring Report for the period January 2009 – November 2012, for the three operational HPPs. The Monitoring Plan dated 13 August 2008 is part of the JI Project Design Document (PDD) and of the Project Proposal, awarded under a contract by NL Agency – the organization managing JI Projects for the Dutch Government, within the ERUPT II program. The current verification has been performed according to the Romanian Track I procedure.

## 2.3 Limitations

In 2008 the project was determined by KPMG Sustainability BV<sup>1</sup> against the requirements of the JI Guidelines as set out in decision FCCC/KP/CMP/2005/8/Add.2 of 30 March 2006 on the basis of the PDD.

Following the 25<sup>th</sup> meeting of the JISC on 21-22 June 2011, KPMG Sustainability BV received the accreditation (AIE) starting 1 August 2011, for a period of 5 years.

KPMG Advisory N.V. will not accept any liability if the appropriate Romanian Authorities do not issue the verified ERUs in due time, as set out by the EU Directive on this subject.

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<sup>1</sup> KPMG Sustainability BV merged with KPMG Advisory N.V. in October 2008, KPMG Sustainability is since a trade name of KPMG Advisory N.V.



KPMG Advisory N.V. does not accept any liability for any consequences in the event of the accreditation being suspended by the Joint Implementation Supervisory Committee at a later time than the issuance of the current verification report.

## 2.4 Verification methodology

In this chapter we have described the specific focus of KPMG Advisory N.V. related to Joint Implementation verification projects.

### *KPMG Advisory's approach – a risk based approach*

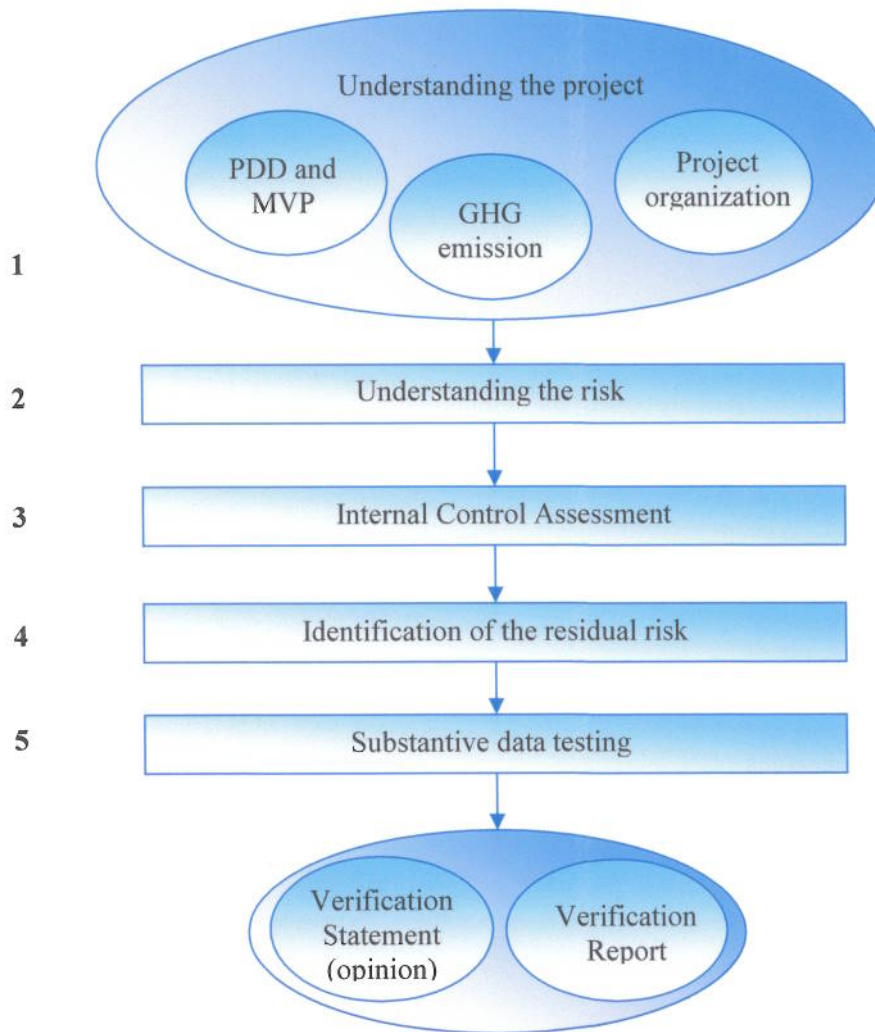
The risk-based audit approach applied by KPMG for the verification of emission reports contains an assessment of the internal controls in the reporting organization. The approach includes an identification of the risks of misstatement of the emission data and an assessment of the management systems used for emission data generation and reporting. If the internal control environment for emission data generation and reporting is strong, the data testing can be limited.

The basis for the verification is the PDD of the project and the related Monitoring Plan. In this plan, the monitoring of the parameters necessary for determining the project emissions are described by the project management.

### *Organization of the verification process*

The risk-based approach to verification is organized using the approach shown in the figure below. The five basic steps are as follows.

1. The project begins with an understanding of the project and the project's risks.
2. During the Internal Control Assessment (ICA) the controls are assessed. This step concentrates on the audit trail and on the internal control system that should provide evidence for a conclusion. The data gathering process and the ability of this process to generate accurate and complete data are discussed. Also the appropriateness of the internal checks and the review process that are part of the ICA are assessed.
3. After the Internal Control Assessment, the residual risk is determined in order to design an approach for substantive data testing.
4. If the Internal Control appears to be strong, substantive data testing is limited. Some data testing is inevitable before conclusions can be drawn.
5. The findings of the verification are reported in the verification report. The main conclusions are presented in the verification statement.





### 3 Verification

The activities carried out during the verification and the period when these activities were performed is described in the following sections.

The Monitoring Plan included in the PDD used in developing the Monitoring Report for the period January 2009 – November 2012, has been the basis for the verification. As the current verification process is performed before the end of 2012 (because of the EC Climate Change Committee decision published on 13 December 2012 on changes to EU ETS registry rules mentioned in chapter 2 - Introduction), the verification of ERUs related to the year 2012, was performed only for the period January - November.

#### 3.1 Verification team

The following team has carried out the verification services:

Name	Organization and role in the project
Eric Koudijs	KPMG Sustainability The Netherlands, Senior Manager, Project Leader/Reviewer
Gheorgita Diaconu	KPMG in Romania, Director, Sustainability Advisory Services, Verifier
Andreea Popescu	KPMG in Romania, Manager, Sustainability Advisory Services, Verifier
Alin Tiplic	KPMG in Romania, Senior, Sustainability Advisory Services, Verifier

*Table 1: Verification team*

#### 3.2 Interviews

KPMG Advisory N.V. received the draft monitoring report for the period January 2009 – November 2012 on 7 December 2012. After this report was examined, our findings were discussed during the site visits to the three operational HPPs (Robesti, Plopi and Raul Alb) with the Hidroelectrica representatives on site.

Interviews with key personnel in Hidroelectrica hydropower plants, as well as with employees from local subsidiaries of the Company that control the HPPs, in charge of electricity production control, monitoring, recording and devices maintenance were conducted during the site visits. The electricity measurement and monitoring devices (meters) were presented to the verifiers.

Hidroelectrica IT operational systems (SCADA, Galaxy and Meridian) used both in the HPPs and in subsidiaries (Energy Management Service – SMED) for recording electricity production and electricity supply to the grid, were described to the verifiers. Evidence for the instantaneous electricity production registrations was obtained on the spot.

The following persons were interviewed during the verification process:

Location/date	Interviewee	Position
<b>HIDROELECTRICA HEADQUARTERS</b> 10 December 2012	Dana Horhoianu	Environmental Inspector
<b>CORNETU STATION</b> 11 December 2012	Ovidiu Spatari	Area Manager
	Mircea Pavlovschi	Cornetu Station Manager
	Dorin Roman	Maintenance Engineer
<b>ROBESTI HPP</b> 11 December 2012	Gheorghe Ciobanu	HPP Manager
	Iosif Cenusă	Head of Exploitation Division
<b>SIBIU SUBSIDIARY</b> 11 December 2012	Constantin Bunoiu	Head of Energy Management Service
	Angela Dima	Head of Energy Office
	Vasile Mihai	Environmental Inspector
	Mariana Popa	Quality Management Inspector
<b>HATEG SUBSIDIARY</b> 12 December 2012	Ioan Suciū	Head of Energy Management
	Petrisor Gheorghita	Technical Director
<b>PLOPI HPP</b> 12 December 2012	Giura Dorin	HPP Manager
<b>CARANSEBES SUBSIDIARY</b> 13 December 2012	Marius Cornoiu	Energy Management Engineer
	Dana Hehn	Environmental Inspector
	Livia Trulea	Quality Management Inspector
<b>RAUL-ALB HPP</b> 13 December 2012	Ianas Radoi	HPP Manager

Table 2: Overview of site visits and interviews

### 3.3 Review of documents

As stated in the Monitoring Plan (part of the PDD), the data used for calculation of the ERUs is based on the records from the meters installed at each HPP, measuring the electricity supplied to the National Electricity Grid (SEN).

As data on electricity production as well as electricity supplied to the grid related to the year 2012 is only available for January - November 2012, the related monthly reports were used as the basis for calculation the related ERUs.

A random selection of internal and external data (i.e. hourly/daily/monthly electricity production and electricity supplied to the grid, electricity exchange protocol and minutes concluded with the local electricity distribution companies - CEZ, Enel, operation programs,



errors processing document) was used for verification of the quantity of electricity delivered to the SEN. The information on electricity production and supply was also tested by extracting the data from the company's IT systems (SCADA, Galaxy and Meridian), or from the company's records (hard copies).

Hidroelectrica's Integrated (Quality, Environment, Health and Safety) Management System (IMS) procedures/instructions/process sheets, especially those related to data recording, reporting and verification were reviewed and tested. Monitoring and measuring devices checks and maintenance procedures were also discussed and reviewed.

Job description documents for the personnel involved in data reading, reporting and verification, as well as for the personnel involved in the periodical check of measurement devices were reviewed.

The Internal audit process sheet (setting the frequency of the internal audits, responsibilities, performance indicators checked) and internal audit reports, including corrective and preventive action reports were provided and checked by verifiers.

### 3.4 Sites visits

Sites visits to Raul Alb, Plopi and Robesti HPPs were performed in the period 11-13 December 2012 by KPMG verifiers. The following key persons were interviewed and the following subjects were discussed during the site visits:

*Dana Horhoianu, Environmental Coordinator and Project Manager:* A brief presentation of the project's history, development stages over time and its results. Discussions on the CEF used, the formal paper submitted by Hidroelectrica to the MOEF and the Ministry's answer, data collection related to electricity production and supply, verification process of generated data, procedures related to the Integrated Management System, internal audit records. Discussions on reported data validation and verification procedures were also held.

#### ***Cornetu Station, Robesti HPP, Sibiu Subsidiary***

*Ovidiu Spatari, Area Manager:* Discussion related to the area development project (Cornetu-Avrig Hydropower Development for the Olt river), a brief history of the project, brief description related to the construction of electricity supply infrastructure, protocols concluded with CEZ (electricity distribution company), data reporting and verification process.

*Roman Dorin, Maintenance Inspector at Robesti HPP:* Discussion related to the maintenance program for electricity meters (reading, maintenance and calibration process).

*Mircea Pavlovschi Cornetu Station Manager:* Discussion related to technical matters concerning the electricity supply to the SEN. Brief description of the electricity delivery infrastructure (110 V).

*Iosif Cenuse, Head of Exploitation Division:* Discussion related to the electricity monitoring process and meters calibration as well as the verification (as appropriate) of electricity records.

*Gheorghe Ciobanu Robesti HPP Manager:* Discussion focused on electricity records, verification of turbines and how the data is recorded on the spot; records of the maintenance process, monitoring and measurements devices (MMDs), as well as their verification and how the verification results are registered. During the interview, the preventive maintenance procedures and program as well as the intervention procedure to be used when needed were

presented. Statements that IT system access passwords (and IDs) are used by HPP personnel were pointed out and a demonstration was performed on this subject.

*Constantin Bunoiu Head of Energy Management Service (SMED):* The discussion related to the process of data monitoring as well as electricity production and supply; how the data are recorded, as well as the information system used – SCADA. Discussion about the central monitoring system, energy balance sheet, how the production of energy can be managed in the case of emergencies (lack of water in lakes, flooding, snow melting seasons, etc). The head of SMED also provided information related to the security system as well as on the data in relation to the quantity of electricity produced every day, how the systems generate various types of reports (e.g. weekly, monthly reports). Procedures on data reading and reporting were also discussed. Demonstrations were made of existing information systems on site, as well as how the system generates various types of reports (e.g. weekly, monthly reports).

*Angela Dima Head of Energy Department* – Discussion related to the protocols with CEZ, meter maintenance, preventive maintenance procedures and frequency of internal audits in relation to energy production; discussions on reported data validation and verification procedures.

*Vasile Mihai – Environmental Inspector:* Discussion related to environmental authorizations, environmental inspection notes, as well as environmental management system implementation and specific records.

*Mariana Popa – Quality Management Inspector:* Discussion related to the Quality Management System, implementation process, frequency of audits, how errors (if they occur) are recorded, and who the person is who is in charge of various procedures;

#### ***Hateg Subsidiary – Plopi HPP***

*Ioan Suciu, Head of Energy Management Service (SMED):* The discussion related to the monitoring data and electricity production, how the data are recorded, as well as the information system used – SCADA.

*Petrisor Gheorghita, Technical Director* the main topics discussed were related to the project implementation, construction stages, technical data, and commissioning of the HPP Plopi.

*Giura Dorin, Plopi HPP Manager:* discussion related to production process data management and reporting. Issues relating to the internal verification process of registered information on production were also discussed, and how all of these are recorded in the Information System - Meridian. A demonstration related to the information system (Meridian) on site, as well as on how the system generates various types of reports (e.g. weekly, monthly reports) was performed.

#### ***Caransebes Subsidiary, Raul Alb HPP***

*Marius Cornoiu, Energy Management Engineer:* The discussion related to the monitoring system for the electricity produced on site, the verification of meters, calibration, as well as to the data processed for energy supplied to the SEN. The bidding procedure for the energy produced and the registration methods were also discussed. During the interview, the procedures to be adopted in the case of meters failure were discussed.

*Dana Hehn, Environmental Inspector:* The discussion related to Environmental Authorizations, Environmental Findings, implementation of the Environmental Management System as well as environmental procedures and instructions on site.



*Livia Trulea, Quality Management Inspector:* The discussion was focused on the Quality Management System procedures, and internal audits performed.

*Ianos Radoi, HPP Manager:* The discussion involved a brief presentation of the HPP, its construction stages, commissioning phases and the procedures for inspection, maintenance and calibration of measuring devices used for providing data. The meters registration procedure (via Galaxy information system) was also presented, as well as how the dispatch has access to the information system (using its own IDs and passwords). The process of maintenance of monitoring and measurements devices (MMD), as well as their verification and how the verification results are registered was clarified. Procedures on data quality check, data reading, collection and reporting were also discussed.

### **3.5 Assessment**

The verification process was based on the following:

- Review of the final determination report in the context of the project's PDD.
- Review of the verification report for the period January 2009 – November 2012.
- On site inspection for the 3 HPPs (Robesti, Plopi and Raul Alb) and review of electricity production records.
- Testing of specific procedures for monitoring and measurement, data collection/validation/reporting, incidents reporting, electricity supply and other procedures or instructions that are in connection with recording electricity production.
- Testing the method for checking the accuracy of monitoring equipment and rules for equipment calibration.
- Interviews with Hidroelectrica key personnel involved in data collection, data processing, validation and reporting, both from hydropower plants and in local subsidiaries of Hidroelectrica.
- Review and assessment of monitoring results and verification of the correct application of the monitoring methodologies comparing with the Monitoring Plan included in the JI project PDD.

### **3.6 Report of Findings**

We obtained the necessary evidence for the reported emissions reduction as stated in the *Monitoring Report for the period 1 January 2009 – 30 November 2012, for JI project Hidroelectrica Hydropower Development Portfolio.*

We analyzed the JI project PDD and the related determination report against the monitoring report and we noticed the following:

- The initial project proposal included the development and commissioning of 9 HPPs (Dumitra, Bumbesti, Nehoiasu II HP, Firiza I, and Firiza II, Racovita, Rastolita, Raul Alb, Plopi and Robesti) located in different hydrographical basins in Romania. For financial and technical reasons (e.g. Dumitra, Bumbesti and Nehoiasu HPPs had difficulties related to the excavation of the underground main under-pressure discharge, due to the stability of the rocks/mountain and Rastolița HPP had problems with expropriation of the necessary areas for the lake) only three (Raul Alb, Plopi and Robesti HPPs) of the nine HPPs were commissioned in the period 2009 – 2012.
- Delays occurred to the initial schedule for commissioning the Plopi and Robesti HPPs. In the PDD, the forecast commissioning year for Plopi was 2009, but the HPP was gradually put into operation between August 2010 (Hydro Generation Unit HGU 1) and September 2010 (HGU2). Also, as stated in the PDD, the estimated year of commissioning for the Robesti HPP was 2010 and the plant started to operate only in April 2012.
- Estimation of electricity production by the project in the period 2009-2012, compared to the electricity production achieved was:
  - For 2009, estimation of 43,700 MWh, realized 61,022 MWh.
  - For 2010, estimation of 233,200 MWh, realized 79,831 MWh.
  - For 2011, estimation of 515,900 MWh, realized 43,445 MWh.
  - For 2012, estimation of 739,550 MWh, realized 88,613 MWh.

## **4 Verification findings**

### **4.1 Remaining Issues, CARs, FARs from Previous Verification**

As no verification process has been previously performed, there are no remaining Correction Action Requests (CARs) or FARs.

### **4.2 Current CARs**

There are no Correction Actions Requests.

### **4.3 Project Implementation**

The project proposal included the development and commissioning of 9 new HPPs (Dumitra, Bumbesti, Nehoiasu II, Firiza I, Firiza II, Racovita, Rastolita, Raul Alb, Plopi and Robesti) located in different hydrographical basins in Romania. For financial and technical reasons (e.g. at Dumitra, Bumbești and Nehoiasu HPPs difficulties related to the excavation of the underground main under-pressure discharge, due to the stability of the rocks/mountain; at Răstolița difficulties with expropriation of the necessary areas for the lake) only three HPPs (Raul Alb, Plopi and Robesti) out of the nine planned were commissioned in the period 2009 – 2012.

Additionally, the initial schedule for commissioning the Plopi and Robesti HPPs was not fulfilled. In the PDD, the forecast commissioning year for Plopi was 2009, but the HPP was gradually put in operation between August 2010 (HGU 1) and September 2010 (HGU 2). Also, as stated in the PDD, the estimated year of commissioning Robesti HPP was 2010 and the plant started to generate electricity only in April 2012.

#### *Emissions reduction*

The decreased electricity production (because of the reduced number of HPPs put into operation, delays in commissioning the operational ones, and dry weather conditions) compared to that forecast in the PDD, significantly impacted the emissions reduction expected to be generated by the implementation of the project in the period (2009 – 2012), as follows:

- For 2009, estimation of 36,402 (tCO<sub>2</sub>) ERUs; 50,831 (tCO<sub>2</sub>) ERUs realized.
- For 2010, estimation of 194,256 (tCO<sub>2</sub>) ERUs; 66,500 (tCO<sub>2</sub>) ERUs realized.
- For 2011, estimation of 429,745 (tCO<sub>2</sub>) ERUs; 36,190 (tCO<sub>2</sub>) ERUs realized.



- For 2012, estimation of 616,045 (tCO<sub>2</sub>) ERUs; 73,815 (tCO<sub>2</sub>) ERUs realized.

Even though in 2009 the electricity production was higher than estimated, a total of 1,049,112 ERUs are missing because of low electricity production in the following years (six of the proposed HPPs were not put in operation and two of those operating were commissioned later than forecast).

## 4.4 Monitoring

As stated in the Monitoring Plan the input data used for emissions reduction generated by the Hidroelectrica current JI project consists of electricity supplied to the grid.

Electricity produced by each HPP is monitored by its own IT monitoring tools (Galaxy and Meridian) and then the related data is centralized daily by the Energy Management Service (SMED) and sent to Hidroelectrica's headquarters. Before sending data (daily energy balance sheets) to Hidroelectrica, the head of SMED approves the related information.

Electricity produced by each HPP is monitored in real-time through monitoring systems (Galaxy and Meridian) which collect data and parameters from the installations and display them on monitors in the control rooms of the HPP and the headquarters of the subsidiary.

At the end of each day the related production data are centralized by the Energy Management Service (SMED) and sent to the Hidroelectrica headquarters.

- The effective values of the electricity produced which is delivered to the SEN is registered as follows: For HPP Robesti – data is registered on CEZ meters and witness meters owned by Hidroelectrica, installed in the transformer station of Cornetu HPP, where the exchange point with CEZ Distribuție (the local distribution company) is located.
- For HPP Plopi – data is registered on meters owned by Hidroelectrica and accepted by Enel Distribuție Banat (the local distribution company), which are installed in the transformer station of Plopi HPP.
- For Rau Alb HPP - data is registered on meters owned by Enel Distribuție Banat (the local distribution company) and witness meters owned by Hidroelectrica, installed in the transformer station of the HPP.

At the end of each month, based on an agreement between the subsidiary and the local distribution company, the registered values on the meters are checked and validated through protocols signed by both parties.

The data used for electricity delivered to the grid in Robesti and Raul Alb, is generated by the local distribution company's meters, and checked by Hidroelectrica's witness meters (ELSTER type).

For Plopi HPP the delivered electricity is measured only by the Hidroelectrica meter (ELSTER type) which is also agreed and accepted by the electricity distribution company (Enel). If this meter fails, there is an accredited electrical maintenance company on site (Hidroserv) which carries out the meter replacement work and the related verification.



For Robesti and Raul Alb, where Hidroelectrica owns witness meters, a special person in charge of the relationship with the meter producer deals with possible meter issues (metrological verification, meter replacement, calibration).

The replacement and maintenance of the meters are carried out by the producer (ELSTER), according to a special integrated management system procedure (Measurement and monitoring equipment verification and maintenance).

All Hidroelectrica's meters are subject to metrological verification and calibration rules: according to applicable law on metrology (Legal Metrology Romanian Office Order no. 48/2012), meters should be verified after 5 to 8 years of operation.

## 4.5 Emission Reduction Calculations

The spreadsheet formulas from the initial Monitoring Plan have been used for the emission calculation in the Monitoring Report for the period January 2009 – November 2012.

The monitored data used for the calculation of ERUs is electricity delivered to the grid measured in real time for each unit. The monthly registered values are compared and checked against the measured values by the electricity distribution companies (CEZ and Enel).

The baseline scenario (in the PDD) for determining the CO<sub>2</sub> emissions that would have occurred in the absence of the project, was planned to be assessed on an *ex post* basis, using the verified data for grid-connected Romanian power production installations which come under the EU-ETS. For the calculation of the annually modified grid-based CO<sub>2</sub> baseline emission factor, a CO<sub>2</sub> Emission Factor data collection protocol was established. Unfortunately this protocol was not operational by the end of 2012.

Taking into account the situation related to the above mentioned protocol, Hidroelectrica requested the MOEF (letter no. 106671/29.11.2012) for approval to use a conservative CO<sub>2</sub> emission factor value of 0.833 t CO<sub>2</sub>/MWh calculated in the PDD of the JI project of CET Timisoara Centru in August 2006, also for the verification of the ERUs resulting from the current JI project in the period January 2009 – November 2012. The MOEF responded to this request (letter no. 37047/ED/11.12.2012) that this is acceptable under the condition that the CEF is calculated with methodology ACM0002 and the final CET value should remain below the maximum value of 1.1 t CO<sub>2</sub>/MWh for Romania included in the Communication of the Commission of the EU: "*Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012; Annex IV*".

In order to support the conservativeness of the CO<sub>2</sub> emission factor used, Hidroelectrica referred to the use of a CO<sub>2</sub> emission factor value of 0.9215 t CO<sub>2</sub>/MWh described in recent PDDs of other renewable energy Joint Implementation projects in Romania (Dorbantu and Casimcea wind farm projects). This factor was based on ACM0002 and provided by ANRE according to the PDDs and validation reports of these projects.

Due to the limited time for preparing the Monitoring Report and the circumstances that ANRE was working on the publication of CO<sub>2</sub> emissions factors for the use in renewable JI projects Hidroelectrica did not calculate the CO<sub>2</sub> emission factor themselves but used the CO<sub>2</sub> emission factor of the above mentioned project. This can be considered a deviation with the monitoring plan. However, the JI Guidelines allow for using an approach for baseline setting and

monitoring already taken in comparable JI cases. Moreover a CO<sub>2</sub> emission factor of 0.833 t CO<sub>2</sub>/MWh can be considered conservative as other JI projects apply a higher factors.

#### **4.6 Quality of Evidence to Determine Emission Reductions**

The verification team was provided with supporting documents (see Appendix B) to be reviewed to obtain evidence for the reliability of the related emissions reduction calculation.

Interviews with personnel responsible for data collection, recording, checking and reporting and measuring and maintenance systems have been held to verify the information flow: from the operational level (HPP) to a local centralization/additional check (subsidiary) and finally to corporate level.

Hidroelectrica representatives answered the questions of the verifiers openly, and all documents and proof requested were made available to the verification team.

#### **4.7 Management Systems and Quality Assurance**

Hidroelectrica has implemented and certified the Integrated (Quality, Environment, Health and Safety) Management System (IMS) which includes specific procedures related to the monitoring and reporting process.

There are general procedures, instructions and process sheets at corporate level, applicable to all Hidroelectrica plants and operational procedures, implemented at subsidiary level, adapted to the specific activity conducted.

Operational procedures, such as “Production Program Development,” “Energy Balance,” “Electricity Exchange Centralization,” or “Operation Program” are implemented in all Hidroelectrica HPPs.

Clear responsibilities for data collection, reporting and verification are included in the job description papers of the personnel involved in this process both from the HPP sites and from subsidiaries.

The electrician from each HPP monitors the registration of production parameters on the computer for each production group. The hourly production reports generated by the metering program (Galaxy/Meridian) is communicated by the electrician to the dispatcher. Then, the dispatcher reports directly to the HPP manager, who has overall responsibilities for managing the operation of the plant, approves documents and verifies production reports.

The dispatcher, located in the control room of each subsidiary, coordinates the HPP operation, according to the amount of energy which the HPP has been requested to deliver to the SEN. He also monitors production values registered by the SCADA application and manages exceptional situations (e.g.: incidents that require interruption of operations). The Head of the Energy Management Service supervises the activity of dispatchers (working in shifts), verifies the data recorded and communicates with the partner (the local electricity supplier) to sign the electricity exchange minutes. He also reports the quantity of electricity produced and communicates this information as well as other required parameters to the headquarters.

The maintenance engineer is responsible for reading the meters and ensures that periodical verifications are performed in accordance with the technical requirements.



The process diagram for electricity production defines the responsibilities for data monitoring. Monitoring and measurement equipment (e.g.: electricity production meters) are managed according to the procedure “EMM control.” All meters are periodically checked (metrological verification according to the specific law). A database including all meters and their metrological check validity deadline is kept and up-dated, to avoid incidences of non-compliance.

The process sheet “Maintenance – FP-S-2” includes a process diagram with responsibilities, activities and frequency for determining or up-dating the annual maintenance plan for equipment and associated necessary technical documents.

Incidents are managed in compliance with the PO-HE-DE-01 procedure. There are clearly defined steps to be followed in these situations, depending on the severity of the incident or its frequency. For special incidents, an informative note is prepared and sent to Hidroelectrica’s management (the Executive Director) describing the event. After remediation, an analysis report is also submitted to the Executive Director.

Two types of internal audit are performed at local level and at Company level. At least one audit per year is conducted at each HPP, according to the annual audit program and following the proposed audit plan. The process is regulated by a system procedure and a process sheet designed for this purpose. The results of the audits, as well as recommendations for preventive/corrective actions and improvement are discussed during the annual management review and decisions are taken accordingly.

## Appendix A – Key data

<b>Project name</b>	<b>Hidroelectrica Hydropower Development Portfolio Track 1 JI Project</b>
Project description	Development of 9 new hydropower plants located in different hydrographic basins in Romania, reducing the CO <sub>2</sub> emissions that would have occurred in the absence of the project, from electricity produced in thermal power plants.
Project proponents	Hidroelectrica S.A. Mr. Gheorghe Stefan Constantin Nacu no. 3, Bucharest, Romania Tel. + 40 21 303 2500 Fax: + 40 21 303 2564 E-mail: <a href="mailto:secretariat.general@hidroelectrica.ro">secretariat.general@hidroelectrica.ro</a>
Verifier	KPMG Advisory N.V. Amstelveen The Netherlands Tel. + 31 6 5155 3429 Fax. + 31 20 656 4510 E-mail: <a href="mailto:Koudijs.Eric@kpmg.nl">Koudijs.Eric@kpmg.nl</a>
CO <sub>2</sub> emission reductions during the period 1 January 2009 – 30 November 2012	227,336 tones CO <sub>2</sub>



## Appendix B – Reviewed documents

### Corporate level documents

1. Process sheets: „SMI management”, „Electricity production”, „Electricity supply”, „Maintenance” and „Internal audit.”
2. Operational procedures: „Database for market partners”, „Available powers”, „Measurement programs for exploitation” and „Incidents reporting.”

### Documents related to the operations of Robești HPP

3. Technical Management Sibiu reports on: hourly delivered energy, energy balance, daily realization, operation hours, faults centralization.
4. Minutes on monthly energy exchange with CEZ (April - November 2012) and daily records.
5. List of meters, schedule of metrological verification, conformity statements.
6. List of management system procedures on data registration, reporting and verification.
7. Operational procedures (at subsidiary level): „Monthly and annually production program development,” „Energy balance,” „Electricity exchange centralization,” „Dispatcher operative management,” „CHE-SH Sibiu operation program development,” „Exploitation process supervision and control,” „Data saving and storage,” „Documentation detailing verification and repairs to monitoring and measurement equipment,” „Measurements for UCC equipment and devices” and „High-voltage electric installations operation for CHE Robesti.”
8. Job descriptions for the following positions: Head of Energy Management Service, Technician and Dispatcher.
9. Documentation submitted to Environmental Protection Agency (EPA) for issuing of an environmental authorization.

### Documents relating to the operations of Plopi HPP

10. Exploitation report for 12 December 2012.
11. Minutes on electricity produced in September - November 2012.
12. Monthly energy production for 2010, 2011 and 2012.
13. Data on electricity delivered in January-November 2012.
14. HPP’s operation hours (2010, 2011 and 2012).
15. Evidence on counters monitoring.
16. Metering system (Meridian) registrations: energy balance and mechanical reports.
17. Process diagram for energy production.
18. Energy management and Dispatch activity description sheets.
19. List of procedures applicable to the Hateg Subsidiary.
20. Job descriptions for the following positions: Dispatcher, Electrician.
21. Environmental authorization no HD-177/20.09.2011 for Plopi HPP.

### Documents relating to the operations of Raul Alb HPP

22. Presentation related to energy production, monitoring system operation and metering back-up at HPP Raul Alb.
23. Exploitation report for 12 December 2012.
24. Daily energy supplied in November 2012.
25. Provisions of measurement for supplied electricity and maximum registered power.
26. List of management system documentation.

27. Internal audit report and corrective actions report (12 October 2012).
28. Operational procedures (applicable at subsidiary level): „EMM control” and „ Maintenance process control.”
29. Job descriptions for the following positions: Energy Management, Dispatch engineer and HPP Manager.
30. Environmental authorization no. 60/24.04.2012 for Raul Alb HPP.